

August 2014

Utopia In The Apocalypse: Creating A Framework Of Survival Systems

Bryan E. Toepfer
University of Massachusetts Amherst

Follow this and additional works at: https://scholarworks.umass.edu/masters_theses_2



Part of the [Historic Preservation and Conservation Commons](#), and the [Other Architecture Commons](#)

Recommended Citation

Toepfer, Bryan E., "Utopia In The Apocalypse: Creating A Framework Of Survival Systems" (2014). *Masters Theses*. 50.

https://scholarworks.umass.edu/masters_theses_2/50

This Open Access Thesis is brought to you for free and open access by the Dissertations and Theses at ScholarWorks@UMass Amherst. It has been accepted for inclusion in Masters Theses by an authorized administrator of ScholarWorks@UMass Amherst. For more information, please contact scholarworks@library.umass.edu.

Utopia in the Apocalypse:
Creating a Framework of Survival Systems

A Thesis Presented

By

BRYAN EDWARD TOEPFER

Submitted to the Graduate School of the
University of Massachusetts Amherst in partial fulfillment
of the requirements for the degree of

MASTER OF ARCHITECTURE

May 2014

Department of Art, Architecture, and Art History
Architecture + Design Program

Utopia in the Apocalypse:
Creating a Framework of Survival Systems

A Thesis Presented

By

BRYAN EDWARD TOEPFER

Approved as to style and content by:

Kathleen Lugosch, Chair

Ray Mann, Member

William T. Oedel
Chair, Department of Art, Architecture
and Art History

DEDICATION

To my fiancé Marian, who stuck with me through three years of graduate school.

“I do not know with what weapons World War III will be fought, but World War IV will be fought with sticks and stones”

-Albert Einstein

ACKNOWLEDGMENTS

Thank you to my mother and grandmother who supported me every step of the way.
And thank you to Professors Lugosch and Mann, who never once laughed at my absurd
ideas and always pushed me into creating a real thesis.

ABSTRACT

UTOPIA IN THE APOCALYPSE:

CREATING A FRAMEWORK OF SURVIVAL SYSTEMS

MAY 2014

BRYAN EDWARD TOEPFER, B.S., ALFRED STATE COLLEGE

M.ARCH, UNIVERSITY OF MASSACHUSETTS AMHERST

Directed by: Professor Kathleen Lugosch

As medicines continue to evolve, as well as our tendency to misuse and abuse them, viruses become more and more resilient. While the flu is largely an inconvenience which at its worst may result in a missed day of work, it bears the risk of returning to the days of old when it was a terminal disease. With the imminent risk of resistant super viruses emerging, New York City has taken precautions to prepare for the worst case scenario. If deemed necessary New York has plans to completely quarantine and isolate the city from the world. This provides us with the perfect opportunity to ask the question Hollywood has become fascinated with...How would a city like New York function and survive in the Apocalypse? The answer is not as simple as waiting out the storm; with limited resources, no access to the outside world and a crippled infrastructure.

What this thesis also aims to experiment with is the notion of not only barely surviving, but the creation of a new way of life; a truly self – sufficient city, perhaps even creating a Utopian society. This can be analyzed with a systems based approach regarding the different scales of life; from the survival of the individual, the function of the physical shells remaining, and finally the development of a Dynamic City composed new communities.

TABLE OF CONTENTS

	Page
ACKNOWLEDGMENTS	vi
ABSTRACT.....	vii
LIST OF FIGURES	ix
CHAPTER	
1. UTOPIA / DYSTOPIA	1
2. APOCALYPSE.....	11
3. SCENARIO.....	20
4. FRAMEWORK.....	33
5. APPLICATION / IMPLEMENTATION	55
6. FINAL PRESENTATION BOARDS	67
BIBLIOGRAPHY	70

LIST OF FIGURES

Figure	Page
1. Comparison of Utopian Vs. Dystopian	1
2. Tower of David 1994 and 2012	3
3. Spectrums of Survival in the Apocalypse	4
4. New Role of Networks.....	7
5. Matrix of Survival Attitudes	11
6. Desire for Comfort vs. Survival as a Priority	12
7. Diagram of Sole Survival.....	13
8. Diagram of Small Group Survival	14
9. Diagram of Community Survival.....	14
10. Rival Factions (Fear) vs. Strength in Numbers (Community)	15
11. Violent Crime Rates in U.S Cities	16
12. Seeking Refuge vs. Limited Construction	17
13. Diagram of Cells Forming Neighborhoods.....	18
14. Diagram of Economy / Communication Forming	19
15. Macro to Micro Scale of Site Selection	20
16. Simulation of Infectious Disease	27
17. Nature as a Physical Boundary	33
18. Geotropic Food Cylinder	34
19. Filtration of Water through Food Modules	35
20. Transfer of Heat from a Central Water Source	38
21. Central Water Source as Food Habitat.....	41

22. Diagram of Anaerobic Digestion	43
23. Storage of Biogas / Conversion of Existing Toilets.....	45
24. Closed Loop System of Survival	46
25. Modularity of Dynamic City to District of Cells	49
26. Modularity of Static Cells to Physical Cells	49
27. Development of Mini Communities Due to Lack of Vertical Transportation.....	51
28. Vertical Cores in the Tower of David.....	52
29. Morphing / Reclamation of Nature	53
30. Implementation of Elevator as Power Source.....	55
31. Pressure Seals to Create Vacuuming / Syphoning of Water.....	57
32. Diagram of Track and Rail Deployment System.....	58
33. Existing Plumbing Infrastructure of Astor Apartments	59
34. Deployment Diagram of Studio Apartment Unit.....	60
35. Deployment Diagram of One Bedroom Apartment Unit.....	61
36. Deployment Diagram of Two Bedroom Apartment Unit.....	61
37. Deployment Diagram of Three Bedroom Apartment Unit	62
38. Use of Vertical Cores as Network Hubs	62
39. Vertical Thresholds of the Astor Apartments	63
40. Floor Plan of the Apthorp Building	64
41. View of the Apthorp Courtyard	64
42. Floor Plan of the Astor Building.....	65
43. View of the Astor Building.....	65
44. Aerial View of Amsterdam and 79 th Street.....	66
45. View of The Beresford Building.....	66
46. Presentation Boards (First and Second).....	67

47. Presentation Boards (Third and Fourth)	68
48. Presentation Boards (Fifth and Sixth).....	69

CHAPTER 1

UTOPIA / DYSTOPIA

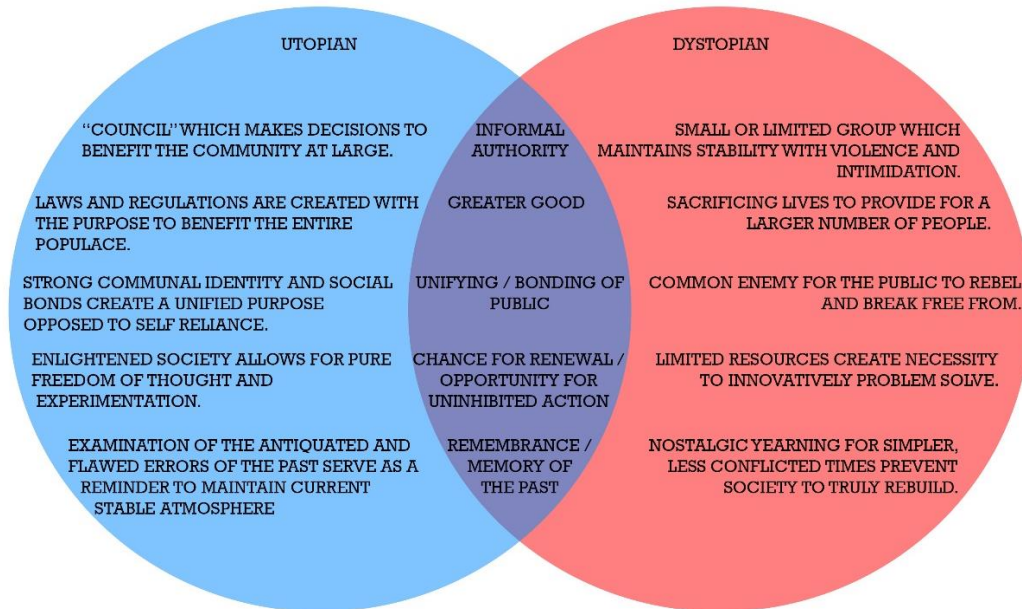


Figure 1. Comparison of Utopian Vs. Dystopian

In 1516 Sir Thomas More penned his fictional narrative “Utopia,” describing More’s vision of a perfect, but ultimately unattainable flawless society. (Yuhas 2012)

Almost five centuries later philosophers and scholars alike still stand in awe of the concept. However, in recent years the concept of Utopian paradise no longer stands as a simple theoretical curiosity for the “educated” to ponder, it now holds a place of wonder and potentially a solution for any person to strive for.

How then is it possible for an idea to be fascinated and elaborated on for over five hundred years with no actual progress towards its realization? The answer lies in Utopia’s biggest fascination doubling as its biggest setback...the mentality that a truly perfect utopian vision is in itself an impossible task, an unattainable goal. In his collection of

lectures “Between Dystopia and Utopia,” Constantinos Doxiadis discusses how Utopia holds different meanings among men, all of which holds them back from any true implementation of it. “Utopia was never the same for everybody. Some people thought that it was synonymous with a happy place, a place of ideal perfection, and earthly expression of paradise. Others, though, thought of it as a place which does not exist, which cannot exist, which is even completely impracticable. Some even gave to it both notions, and thus the confusion was multiplied.” (Doxiades 1966) Simply put, Utopian fantasies are without reason but with dreams.¹

Striving towards this task has not gone without any success. While chasing this elusive goal there is still innovation and minor success. The motivation alone of a truly perfect society has given rise for the necessity of a Utopian fantasy. “Without the Utopias of other times, men would still live in caves, miserable and naked. It was Utopians who traced the lines of the first city...Out of generous dreams comes beneficial realities. Utopia is the principle of all progress, and the essay into a better future.” (Doxiades 1966) Anatole France (along with a multitude of other writers throughout the ages) saw the endless pursuit of Utopia as the primary benefactor for any of man’s achievements. Others argue Utopia is not attainable not because of man’s inability to achieve it, but that no matter how perfect society becomes, we will always have the ambition (and the compulsion) to achieve more. (Oscar Wilde writes that not only must we always chase Utopia but that we have actually achieved it on multiple occasions. Yet we must always chase bigger aspirations.) “A map of the world that does not include Utopia is not worth glancing at, for it leaves out the one country at which Humanity is always landing. And

when Humanity lands there, it looks out, and seeing a better country, sets sail. Progress is the realization of Utopias.” (Doxiades 1966)

So if the penultimate fantasy we are in constant pursuit of has eluded our grasp and understanding these past five hundred years or so, what have we actually created? After some deliberation it would seem we only have a dystopian landscape to claim as our own. (A term reserved for movies about zombie apocalypses and descriptions of war torn ravaged cities.) Many of us though would not agree that we live in such a world.

Dystopia’s first appearance into the world was not until 1818, when Jeremy Bentham described it as the antithesis of Utopia. (Knight 2012) Even with a three hundred year head start, the concept of Dystopia seems to have more success than its overlying concept of Utopia, with arguably much more attention in the arts (literature, movies, paintings and philosophy) and easily more real world relevance and realization. With many poorer parts of the world literally resembling a scene from an old war movie it begins to become easier to recognize our dystopian existence. Many who are fortunate enough to live in some of the more “blessed cities” may not be as eager to accept the flaws concealed.



Figure 2. Tower of David 1994 and 2012

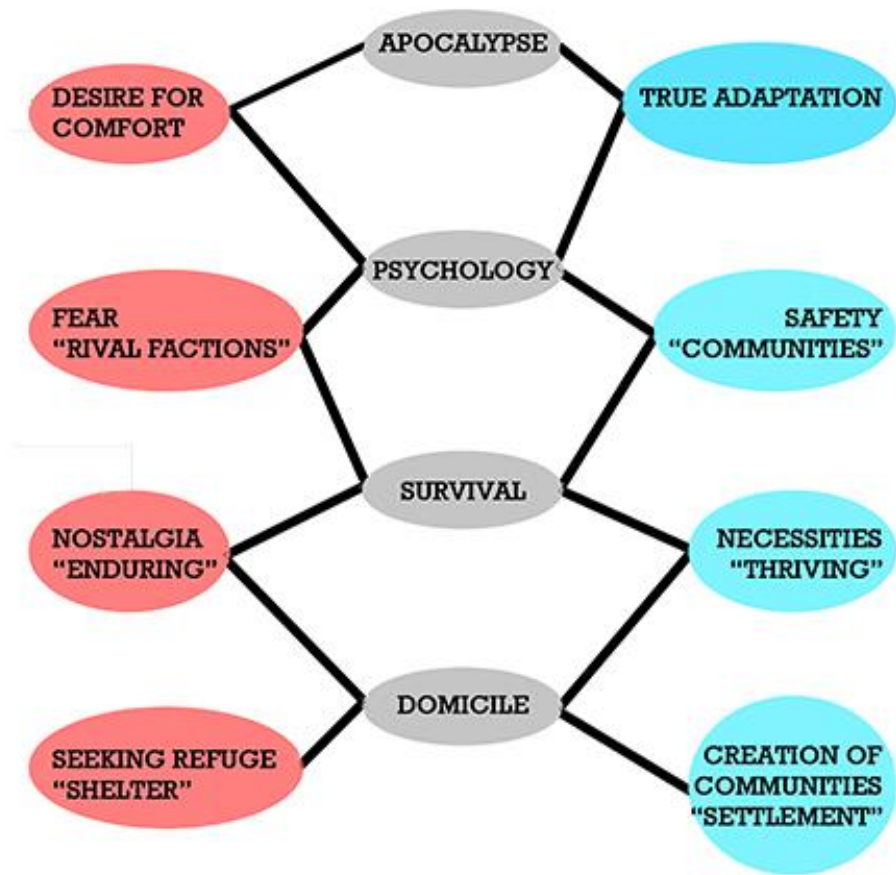


Figure 3. Spectrums of Survival in the Apocalypse

There are countless examples of those who live in less than desirable conditions; one example in particular truly sparks an image of “apocalyptic life,” the Tower Of David in Venezuela. Initially created under the name of The Centro Financiero Confinanzas in 1990, during a time when many wealthy investors viewed third world areas as land ripe for mega structures to invigorate the failing area’s economy. (As well as the megalomaniac egos that sprang these monstrosities in hopes are spawning a new Dubai) Four years later a large banking crisis halted construction and scared off any investors with any hopes of finishing it. The building remains a shell without electricity,

portions of walls, running water or even safety features such as railings, and completed stairs. The building is not remarkable for being unfinished. What is of note is the fact that even without basic necessities there are over three thousand inhabitants living in the building, truly demonstrating human survival in apocalyptic settings. The buildings' inhabitants have formed their own system of securing the building from outsiders, as well as providing marketplaces and services for each other. Not only has an unofficial bartering economic system been established but the "residents" have also formed a governing system to maintain the large number of people.

Whereas a Utopian world is motivated purely by dreams without regard to reason, our dystopian reality is the opposite; with all decisions created by reason regardless of dream. Where the ends justify the means, where the greater good and practicality reign supreme. (Doxiades 1966) For the purpose of this thesis the main focus of examination will be on our cities and urban areas. Not only because these are the largest concentrations of population (With the United Nations Ecological Report declaring this the "Decade of the City") but largely due to the fact that cities have been cited as demonstrations of the ailing aspects of our dystopian world; both physically and societally.

In order to examine, analyze and eventually hope to improve our cities we must first establish a framework in order to examine them. (A similar process that will be discussed later in this paper regarding a different framework) Doxiadis states there are five elements of a truly dynamic and human city. "If we try to understand how our cities suffer, we must look carefully at all five of the elements which constitute them. We very often forget one or more of them and we lose the real picture." (Doxiades 1966) The

elements are; nature, the container; man who settles in it; society formed by man; the shells (houses and buildings) created by man; and the networks. (Roads, water supply, power, etc.)

When closely examining each of these elements individually it is unfortunate to find that each aspect is failing.² When man first began to settle and build cities Nature was the overlying condition and limiter. Nature was truly the container and boundary; cities were limited to a certain size and contained by the outside world, going as far as physically expressing this boundary with walls. This also created a city built at a human scale, limited and defined by the inhabitants who lived in as well as built their very city. Naturally, when presented with physical limitations on size the human density of these settlements grew. When many people (and history itself) view high density as an unsanitary, crowded and horrible condition of a city, it can also be argued that these densities are what truly create a thriving, living place. Nature no longer stands as a worthy adversary to our settlements, once the physical container that held and dictated the size of a city not stands as simply an obstacle for large machines to alter, create or destroy. Once cleared for construction, technology now warps our cities. Buildings are no longer created at a human scale when fifty story towers can easily be constructed.

Consequently, as the city and its buildings themselves get larger so do the distances between humans. Our daily contacts with other people continue to dwindle, creating an isolated and static existence despite dwelling in what appears as a dense city. It is argued that technology has increased our global communication and presence with other humans. There is some truth in this logic but not without its flaws. A vehicle provides us with the means to travel greater distances as well as meeting more people, but

do we take advantage of this? Our global network of electronic communication allows for infinitely more contacts between people, but what is the quality of electronic contacts. We may be able to speak with hundreds of more people a day, but even if we choose to, are we truly creating any contacts that improve our life?

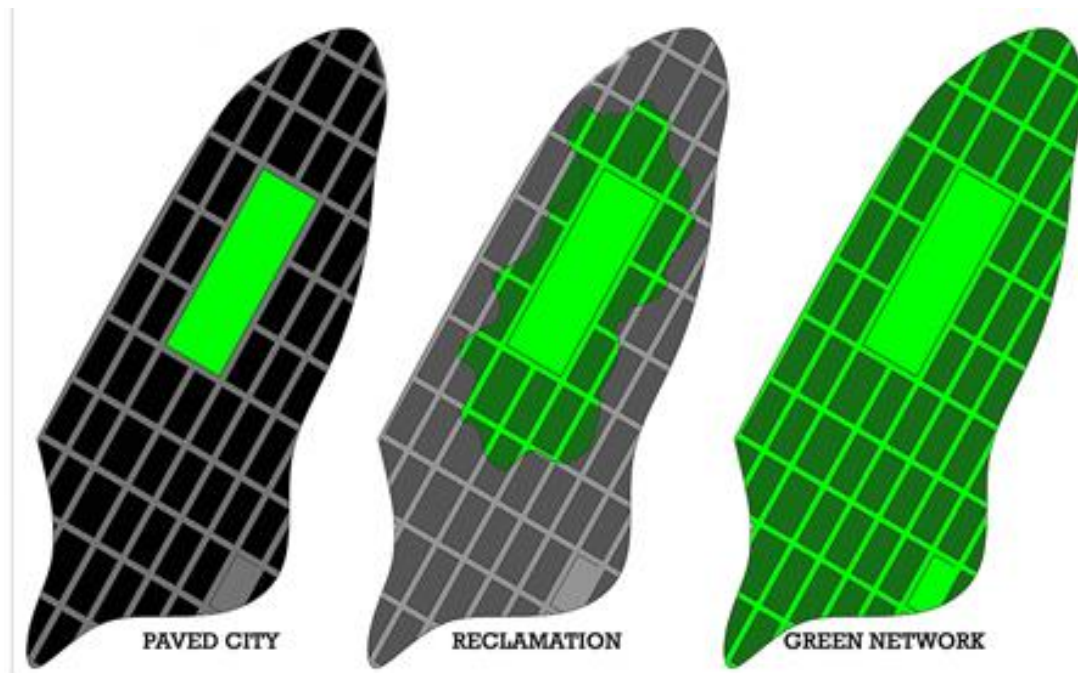


Figure 4. New Role of Networks

“We do not yet know how many of our phobias are due to the fact that as children we are not free to walk in our cities and how many of our nervous disease to the fact that we have lost our privacy. Physically we are gradually turning into centaurs, half – men, half – cars. At the end we will admire only the machines and thus we will be intellectually tamed by them.” (Doxiades 1966) Written forty eight years ago this statement is eerily more relevant now than ever. It is no secret that psychological conditions are ever increasing, crime and disturbances rise exponentially with surrounding population and that technology continues to accelerate at a pace that can

never truly seem rational. (Moe) It would not be fair to blame all of the world's failings on cities, and to assume that city life will always end in disaster. But it is also naive to think that urban life can continue unchecked and everything will work out for the better.

Regarding the shells of our cities, it has already been discussed their construction with little to no thought to human scale or aesthetic value. (Doxiades 1966) Where man once took shelter in caves for physical protection as well as isolation from the outside world, we seem to have returned to this same mindset albeit with much nicer interior spaces. Walking down any main street, one may be bombarded by an intricate hodge-podge of styles, materials and designs. Yet, there is greater concern than an un-unified or unattractive streetscape. There is error in the complete isolation between buildings, both between the shell and the street as well as between each other shells.

Like the veins of a human body, the networks between our cities were created and implemented as a means for exchange and travel of vital components. However, unlike a human's inner workings our networks continue to expand and grow at an alarming pace. The assumption is as the number of roads increase so does the convenience of travel. However, despite the increase in the number of roads, travelling through large cities does not seem to have gotten easier; in fact it has only become more difficult. "In the past it took a maximum of ten minutes to walk to the center of the city, then thirty minutes to reach it by train, and now more than an hour by car." (Doxiades 1966) Our electronic networks do not seem to fall prey to the same deviances however, it only seems to become easier and easier to communicate or exchange over our ever growing electronic network. However this convenience (or dependence) also leaves us too vulnerable if

failure was ever to occur, as any power blackout over extended periods of time has shown.

It all seems daunting to even suggest that a city would need to improve on all of these elements in order to survive. I posit that when approaching this task with a framework similar to the analysis of the doomsday scenarios, it can in fact be achieved. First of all when examining each element based on the amount of time they have existed determines which elements receive how much alteration. The elements that are the oldest will have implanted themselves to the point where change would not only be difficult but would not merit the effort based on the challenges it would bring. The newest ones will carry some difficulty, but can hope to be changed. These are the elements which will receive more attention and effort as they are where the greatest change can occur.³

Returning to the concept of Dystopia on a global scale, (not simply the failing of our modern cities) as the worst scenario of every aspect of life, as well as Utopia as the unattainable paradise, these two philosophies are always seen as complete opposites, truly the combatant of each other and a hindrance to the others success. Yet, the startling reality is when truly compared and analyzed these two ideas are not the complete ends of the spectrum we always view them as, they are in truth the same. Very similar on every aspect, only different in how people actually view them. Both are brought into existence by radical change, and both act as catalysts for extravagant thought and action.

If both concepts are truly one, then how are we living and creating a world of cities which are viewed as dystopian failures? What is needed is the creation of cities which is a combination of Utopia and Dystopia, distilling the necessities and ideas from both. Where Utopia is based only on dreams and fantasy and Dystopia mired only in

reason and reality a collision exists which can achieve Utopian paradise with the dimension of reality to create it, Doxiadis described this combination as Entopia. “We need a recipe: from reality, from topos, even from dystopia, we have to take facts and dimensions; from the utopia, the desire to dream: from ektopia, the contents for the dream; from cosmopolis, the frame; and from the ideal cities, the cells of the organism that we want to create.” (Doxiades 1966) Simply put, we need a city that is with dream and with reality.

1. Often portrayed with impossible structures and with no regard to gravity, these dreamscapes are always beautiful, but unfortunately beyond our realm of limitations.
2. Failing, in this sense, refers to the notion that an emphasis is always placed on money and technology, opposed to artistry or human comfort.
3. The order of the elements based on age is as follows...Nature, being the oldest and therefore most difficult to alter, Man, Society, Shells and Networks, being the youngest of the elements and therefore the easiest to manipulate.

CHAPTER 2

APOCALYPSE

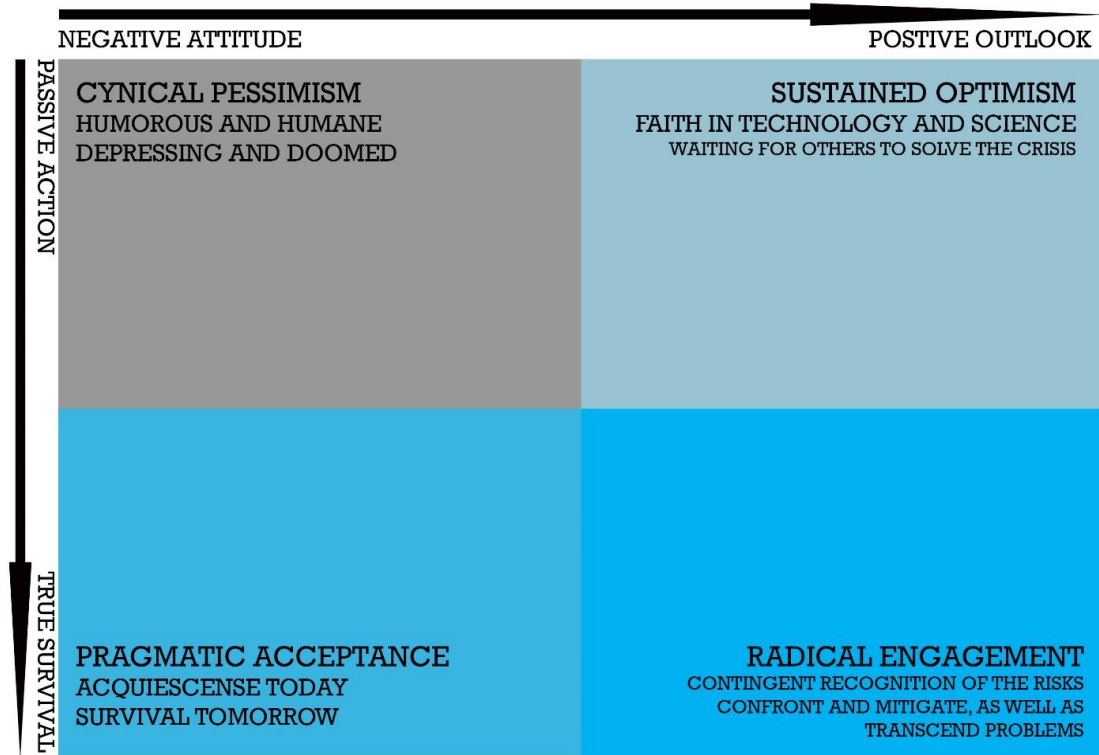


Figure 5. Matrix of Survival Attitudes

It comes to no surprise then that if we’ve been chasing an impossible dream for five centuries and can only lay claim to dystopian cityscapes, that we have naturally grown fonder and more fascinated by another radical concept...Apocalypse. Defined as “Any universal or widespread destruction or disaster,” (Coldner) apocalypse describes a world in which a radical and grand event forever alters and cripples many aspects of the world as we know it. Although initially entering our lexicon to describe religious conflict of good and evil, the sense of Apocalypse has predated both notions of Utopia and Dystopia for hundreds of years.

So why have many been so fascinated with such a horrible and devastating idea? Some may think it's as simple as it being around since man first began to read and write, yet it is much deeper than that. Professor Lorenzo DiTomaso writes in his book "The Architecture of Apocalypticism" that we actually take comfort in the notion of an apocalyptic future, (DiTomaso) People, frustrated with the world as it is, view a complete upheaval of social order as a chance for a better, simple life. "The apocalyptic worldview springs from a desire to reconcile two conflicting beliefs." (DiTomaso) The first is that there is something dreadfully wrong with the world of human existence today," he said. "On the other hand, there is a sense that there is a higher good or some purpose for existence, a hope for a better future." Viewing the world as a flawed place headed toward some sort of cosmic correction reconciles these two beliefs. "So if the world was to "end," regardless of the disaster that brings it about, would people rejoice and treat it as the fresh new start they always dream about?" (DiTomaso) It bears assuming that this would not be the general reaction.

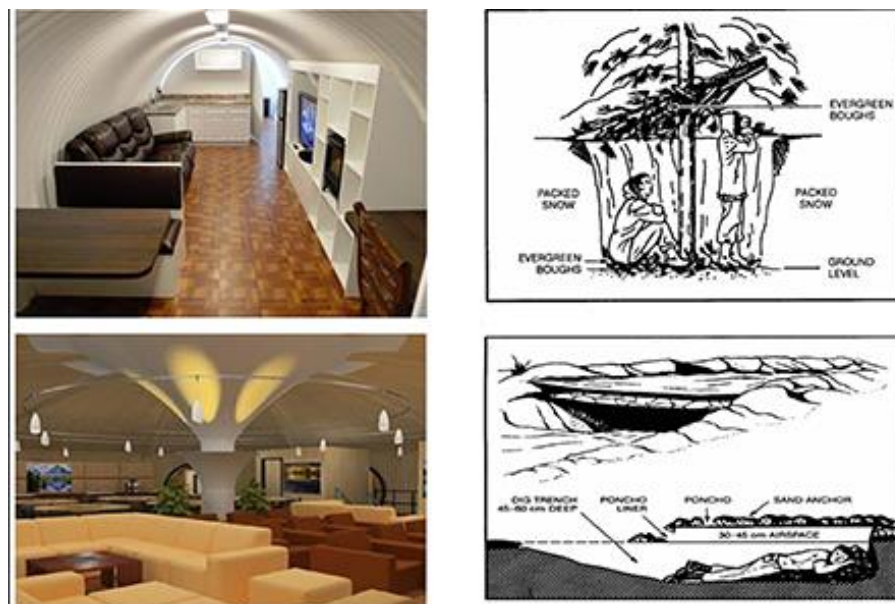


Figure 6. Desire for Comfort vs. Survival as a Priority

Panic would become the primary motivation for most actions.¹ The average home does not prepare and plan for such an event it would appear it would take large amounts of effort to simply scrape by. Yet could the freedom that Apocalypse brings actually provide the avenue for a true Utopian society to take place? Forced to no longer rely on the technology which has taken hold of our society, could cities and individual lives revision a new utopia built at a human scale? People once again relying on each other? “To shift from the utopian to the apocalyptic is not merely to set the terms in an opposing relation, but to understand their similarity. Both describe a condition of radical change.” (Moe)

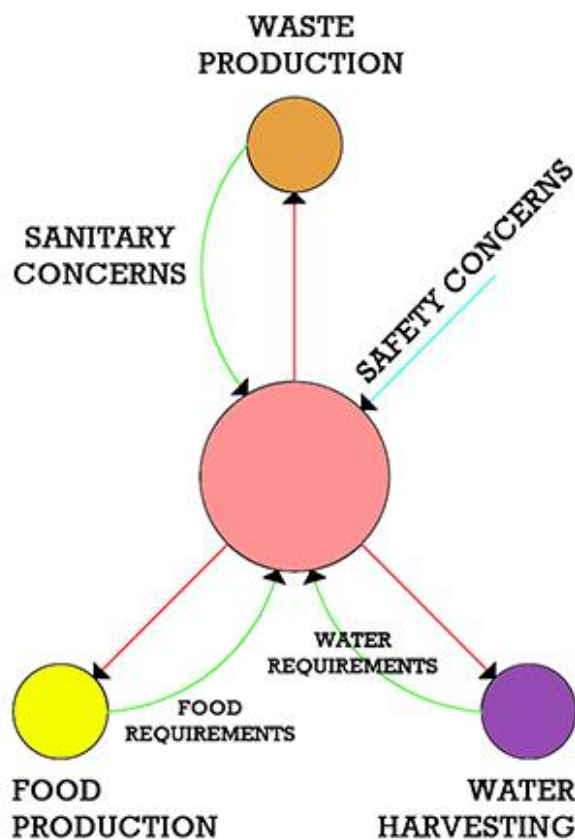


Figure 7. Diagram of Sole Survival

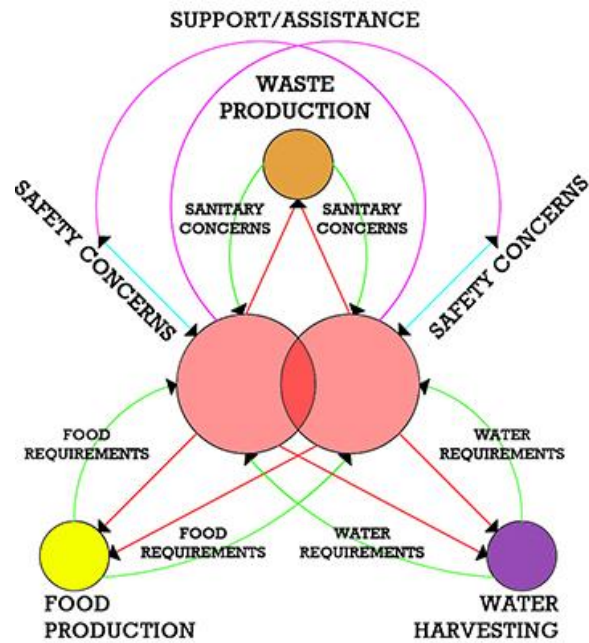


Figure 8. Diagram of Small Group Survival

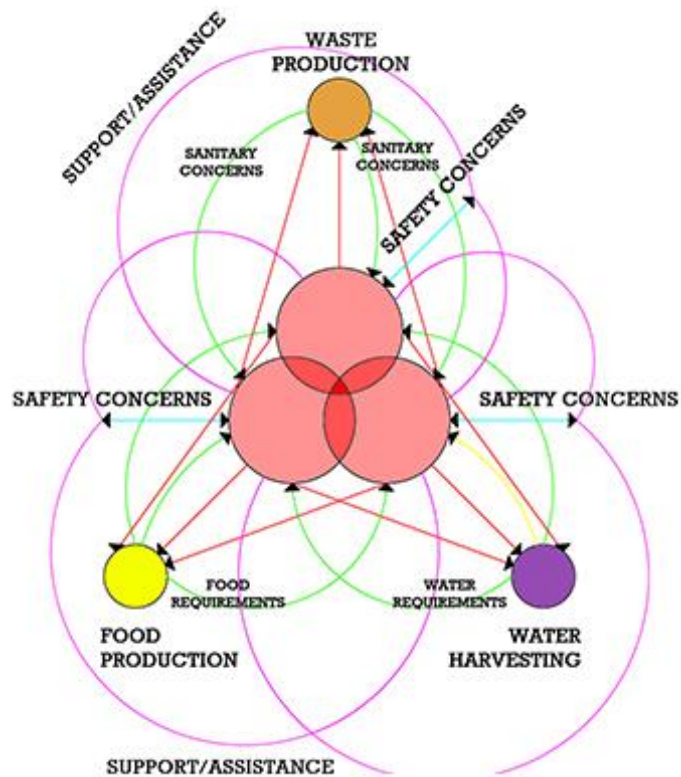


Figure 9. Diagram of Community Survival

It stands to mention that it is not enough to simply survive in a devastated world, true adaptation to the new global landscape will require building a new city, with new communities and new systems of survival. That is the main focus of this thesis, to observe a city in this new devastated world, and create a framework or plan to create this new thriving city. A project such as this will require many assumptions, however precedent studies and data used to support any “outrageous” claims will add some validity to some of these proposed systems and frameworks.

The first aspect, perhaps the most prevalent and nebulous, is the study of human psychology and behavior. While it would be impossible (and unnecessary) to categorize every potential mindset of those affected, it is useful to assume everyone can be studied through one of four psychological profiles. They are Cynical Pessimism, Sustained Optimism, Pragmatic Acceptance and Radical Engagement. (Moe) Each category is explained in the chart below. For the purposes of this project we will look to survivors who have accepted the disaster as an opportunity for a new city, those in the category of Radical Engagement.

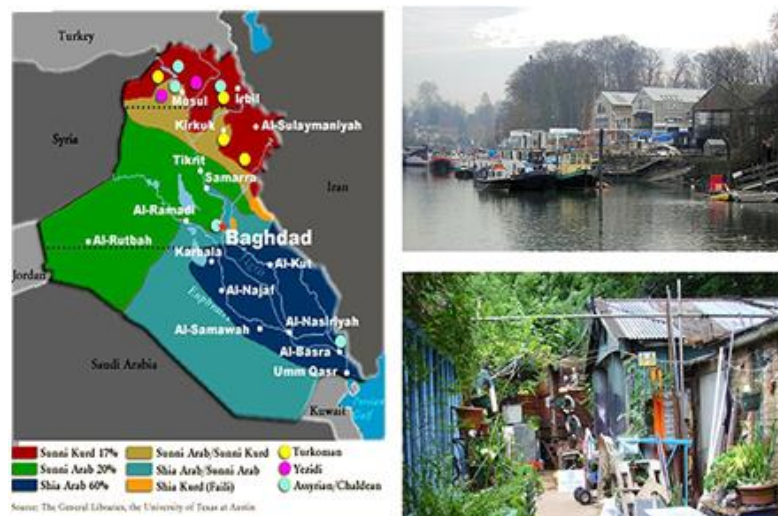


Figure 10. Rival Factions (Fear) vs. Strength in Numbers (Community)

After researching both real world disasters and different psychological literature another somewhat startling fact comes into play. People do not become savage barbarians when faced with disaster; they selflessly bond and help others. In “Dispelling the Myths of Panic” Paul and Ron Gantt write that “Social bonds are not broken during disasters and emergencies; instead bonds are solidified and even created. People die the same way they live, with friends, loved ones and colleagues – in communities.” (Gantt) In fact New York City in particular (the site of this project) documents a noticeable decline in violent crimes during any period following a notable disaster. Prior to the September 11th attacks there is a reported 1,300 crimes per 100,000 inhabitants, however less than a year after that number is as low as 700 per 100,000 inhabitants, four years later and the number is as low as 350 per 100,000 inhabitants. (Gantt)

VIOLENT CRIME RATES IN U.S. CITIES

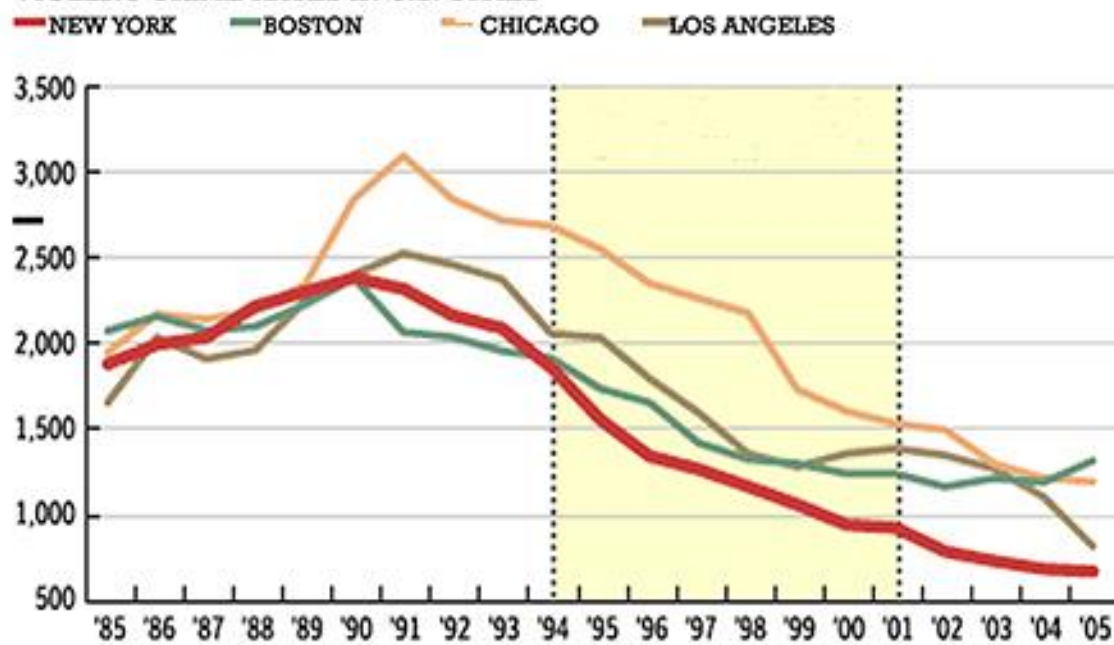


Figure 11. Violent Crime Rates in U.S Cities

New York City is no stranger to disaster, and on October 22nd it was even host to its own version of cataclysmic disaster. Hurricane Sandy not only ravaged the cityscape, it also left the unlucky ones who remained without water, power or public infrastructure. Primitive systems of survival (or innovation if viewed differently) were implemented and the city eventually bounced back. What saved the city in these scenarios is not relevant to this project. I hypothesize there will be a government presence overlooking the new city that will not reflect the prior government. Simply put, there will be no limitless resources or waving of money to fix the city, in fact there will be no economy or even notion of money to exist in the new apocalyptic landscape.



Figure 12. Seeking Refuge vs. Limited Construction

So this provides one aspect of the final direction of this thesis, the creation and shifting of new communities. Doxiadis envisioned his perfect (Entopian) city as a truly

dynamic city which is constructed of static cells. These static cells would each be formed by self-sufficient communities which are responsible for their own needs and survival. Where this will create a dynamic city is the eventual communication and cooperation of each cell with each other, perhaps one day recreating a network of communication, information or perhaps even a new economy, truly marking the dawn of a new age of prosperity.²

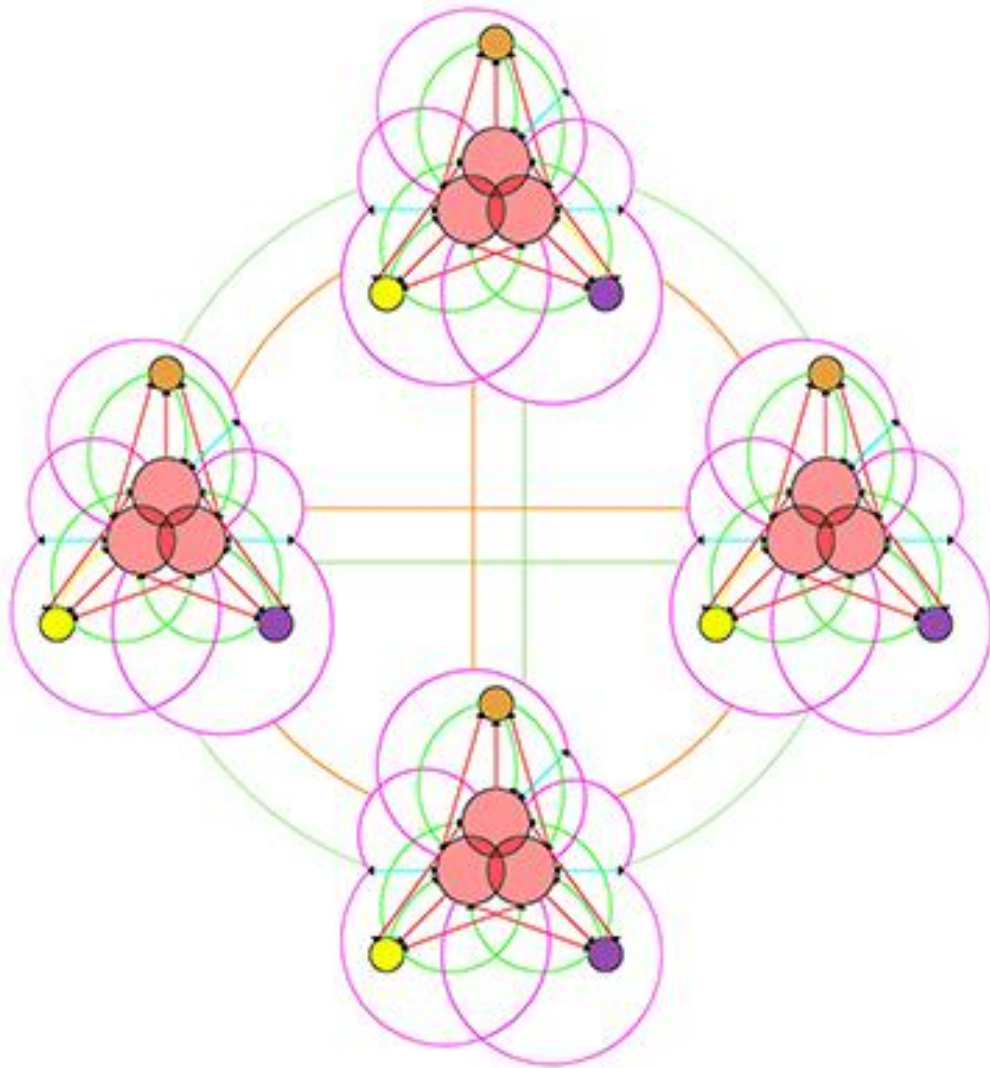


Figure 13. Diagram of Cells Forming Neighborhoods

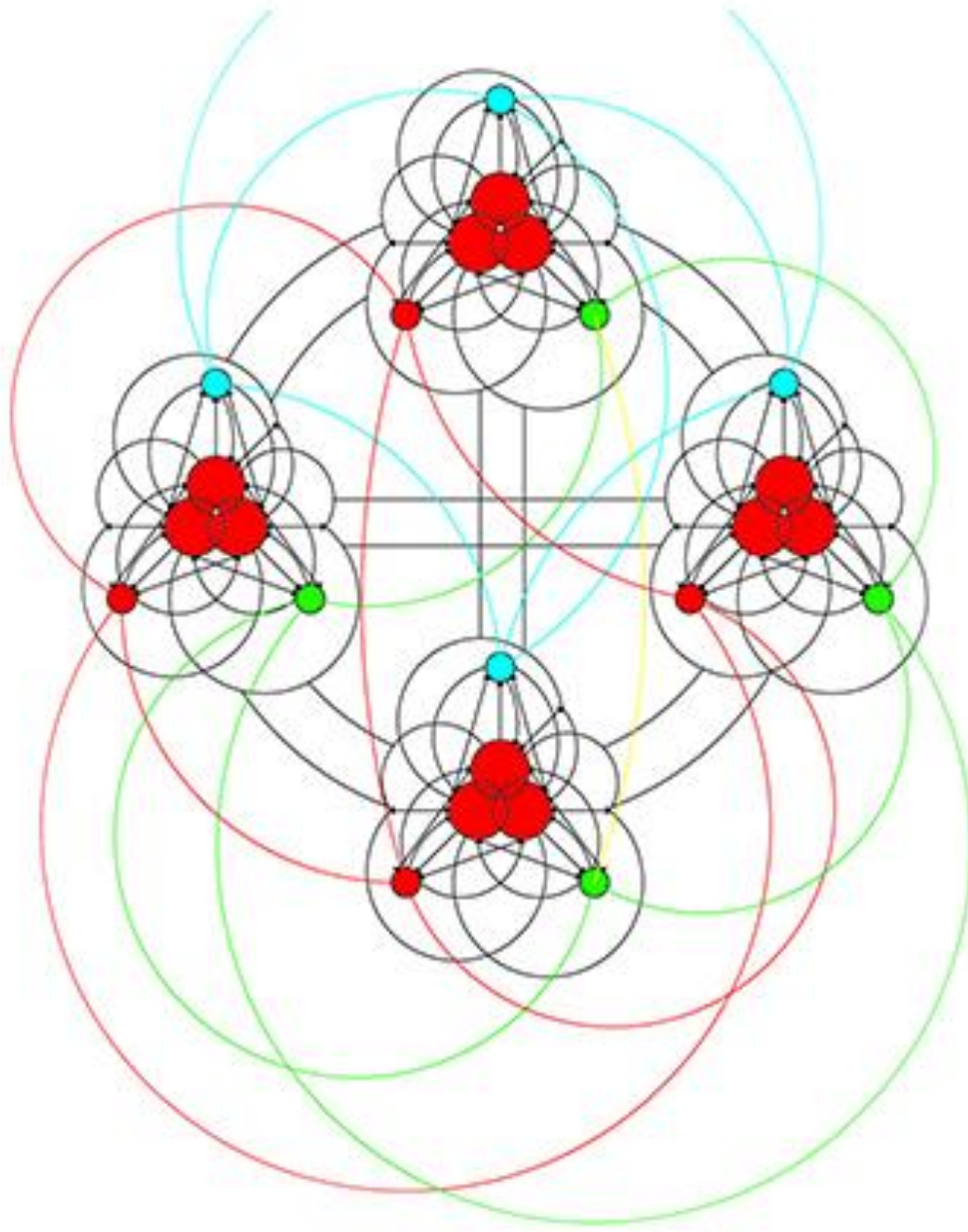


Figure 14. Diagram of Economy / Communication Forming

1. Even though there is data to suggest people bond together in disaster, this doesn't mean that level-headedness and calm demeanors will remain, panic in larger groups can still influence decisions and behaviors.
2. This leads to the idea of designing in "scales" or modularity, completion at a smaller scale can then be plugged into the next level of scope.

CHAPTER 3

SCENARIO

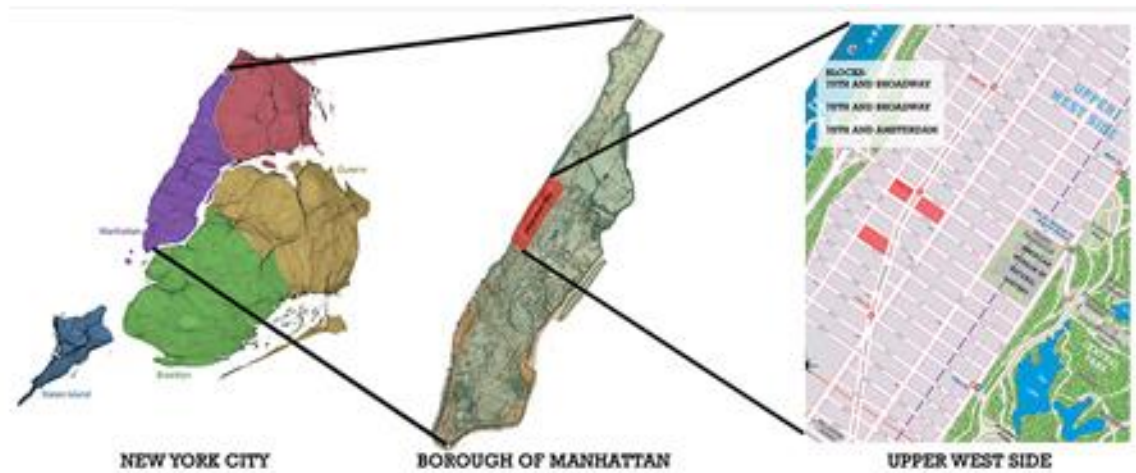


Figure 15. Macro to Micro Scale of Site Selection

Examining how the world reacts post apocalypse has one grand flaw. It hasn't happened, so everything that is "researched" is purely speculation. Naturally, this makes it all too easy to leave it vague or ambiguous. As difficult or even impossible as it is, greater detail is the most important factor in dissecting any dystopian or post-apocalyptic future. Many may assume that the "end of the world" is something that requires no distinction, yet every scenario comes with an infinite number of branching concerns and factors to consider; a world in which pandemic cripples the population results in a drastically different interaction between humans opposed to one where technology has completely vanished.

Again, this is a subject which could become scrutinized by the public's imagination to no real conclusion. Yet, this infinite amount of scenarios can be grouped together in smaller groupings to provide "a set of rules" that cover a broad spectrum of events. The four groupings that have been derived from the list of possible scenarios are

War/Violence, Pandemic/Contagion, Infrastructure Collapse/Technological Failure and Environmental Disaster/Global Catastrophe. Each of these groups are then evaluated on factors which in turn will decide which scenario becomes the basis of this thesis, opposed to simply assuming an arbitrary foundation of research based purely on imagination.

These factors are...

- 1) How drastically the world is affected
- 2) Remaining humans' interactions with each other
- 3) How technology or infrastructure is affected
- 4) Scarcity of resources
- 5) Whether the built environment survives
- 6) Ecological impact
- 7) Likelihood of event

The first grouping of War/Violence happens to be the scenario the general public is most familiar with, no coincidence it also happens to be the one Hollywood and the entertainment industry finds fascinating. While human beings are no strangers to violence or war, the threat of such events grows exponentially as technology and military presence grows as well. As devastating as World War II was in its time, it pales in comparison to what a global conflict could achieve in today's climate of nuclear arms.

- 1) Nuclear attacks drastically alter every aspect of the global facet, from the toxicity of the air down to the devastated ruins of once thriving metropolis.

- 2) As the world is destroyed over conflict of religion, borders, politics, etc. the remaining atmosphere would not change; alienation, fear and selfishness lead to a very negative atmosphere of human interactions, if any at all.
- 3) Military planning and foresight may lead to prior preparation to a global conflict, leading to the potential of limited or even above average technology presence.
- 4) The greatest damage a nuclear attack achieves is not in its destruction, but the lingering effects. Water or healthy soil will become the most valuable, as well as the rarest commodities in a now poisoned world.
- 5) While there is great damage to cities, ruins as well as some smaller structures could survive, leaving limited shelter available.
- 6) As stated before, the world could become poisoned, perhaps to the point of the air becoming unsuitable for life.
- 7) Of all the groupings, this event seems the most likely seeing as its threat is ever present.

Pandemic/Contagion has also become a popular event for us to imagine, although usually presented as novelty. Zombie culture has never been more popular or prevalent. While the zombie scenarios are absurd, the idea of pandemic should not be taken lightly. Of all the scenarios this would most likely be the hardest, if at possible, to recover from and could very well spell the complete end of our species.

- 1) The type of contagion would determine the degree of disaster. While the threat of human life dwindling dangerously low would always be its biggest factor, pandemic also harbors the danger of corrupting the natural world and ecology.
- 2) Humans will either be near the point of eradication or faced with high casualties. Regardless, remaining humans will completely avoid each other, whether out of fear, or contagion.
- 3) The infrastructure of technology is initially unaffected but the fact that it would no longer be run or maintained by the remaining populace.

Infrastructure itself faces the same dilemma but with different effects. (Road networks remain intact while government is completely absent)
- 4) Resources either remain unaffected, potentially leading to scavenging with resulting violence, or due to the contagion resources might become completely rare.
- 5) The built environment is completely unscathed. Buildings and cities remain and may ultimately lead to settlements and civilizations returning one day.
- 6) The natural world is also in great danger if the contagion affects the animals as well, perhaps even leading to the complete collapse of the environment and, subsequently the earth as we know it.
- 7) As science and medical research continues the threat of this event grows.

However, if conflict or scientific meddling remains guarded then this event can remain in our imaginations.

The third group, Technological Failure/Infrastructure Collapse, in theory should be the easiest of all the scenarios for humans to recuperate and adapt. However, it becomes increasingly obvious that while it should be the easiest to survive it is actually be our greatest potential disaster. If one day all the lights turned out and never came back on, would we simply return to a previous age which had no power or would we in fact begin a global panic which would in turn lead to fear, violence, and ultimately our destruction?

- 1) This depends on our reaction; it could lead to a return to the past or the evolution into a tech free future.
- 2) Of all the scenarios this has the greatest potential for humans to band together. Our interactions may be primitive, simply passing each other while looking for shelter, or we have the chance to band together and form communities which in turn lead to working together and slowly rebuilding life.
- 3) Technology and Infrastructure are completely absent. Roads may remain but will no longer be our main network of transport as gasoline and power slowly fade away.
- 4) Resources may not be as scarce as the end of the world usually dictates. It may take some time for us to adapt and learn to survive, but simply by growing our own food we could survive.
- 5) As with Contagion our built environment is completely unaffected.
- 6) This also happens to be the only scenario which actually benefits our earth. The complete collapse of our economic and industrial complex greatly

improves the air and environment, as well as no longer producing power greatly eases the strain on the earth, perhaps even slowly repairing it.

- 7) The likelihood is actually pretty realistic in this scenario. As our population and power demands increase we continually put pressure on the earth and power grid, which could overwhelm existing systems.

The final group, Environmental Disaster/Global Catastrophe is the scenario that is the most unpredictable. No matter how we plan or try to control it, the earth is its own entity. It has an infinite number of ways to alter our way of life, from subtle climate changes to devastating large scale natural disasters.

- 1) As stated before the way this event unfolds is up to chance, however all possibilities have great potential to drastically damage our way of life. In fact, out of all the scenarios this event has the greatest damage on all the factors being discussed here.
- 2) Humans may actually develop positive relationships with each other in order to band together and survive.
- 3) Technology and infrastructure are completely devastated, not only will power be absent, but roads and the environment themselves will be completely ravaged.
- 4) Resources are also scarce; however the environment may still be strong, which leaves the possibility of potential survival resources.

- 5) The built environment is also devastated; the terrain may even be difficult or impossible to even traverse, creating even more distance between settlements and civilization.
- 6) This event has the greatest ecological impact of all the scenarios, from a devastated terrain to an impossible environment for life to survive.
- 7) While our decades of abusing this planet greatly increase the chance of such an event, this is also the hardest scenario to predict or even plan for.

After categorizing, describing and then analyzing each of the doomsday scenarios, for this thesis we will use the scenario of Pandemic / Contagion. This is decided for a couple of reasons, the first being that in recent years it seems to be the most likely to actually occur. With the misuse and abuse of medical advances viruses and infections continuously grow stronger and more resistant to treatment, creating the threat of eventually facing completely resistant “super viruses.” In the past a simple cold or flu could spell death for its unlucky victim; in our life time we have been able to treat these illnesses as inconveniences. However, a day may come where once again we are in terminal danger of something as simple as the flu.

Of all disaster scenarios this also has the least physical damage to the built environment, leaving all its casualties and lasting effects on living organisms instead. The focus of this project is to examine the visioning of new communities and, ultimately, the city itself.

This scenario is primarily chosen for two reasons. The first being that once it has “run its course” or been controlled it can be negligible. Casualties may be high, but once

the initial wave of destruction has ended it is no longer a concern, the focus can once again be shifted to surviving, adapting and eventually rebuilding.¹ It was also chosen because it provided the perfect opportunity to examine a smaller, controllable area. In the case of this thesis New York City (more specifically, the island of Manhattan) can be examined as its own microcosm.

There is plenty of scientific and medical data to show that almost any infectious disease will exponentially spread throughout a defined boundary, regardless of size, infecting every potential victim...all in the course of less than thirty hours. If early intervention is imposed, the casualties may only reach 50%, with this number slowly decreasing if strict quarantine and isolation procedures are placed in effect. Life after worldwide Pandemic is not simply altered if not quarantined; there is no life afterword without quarantine.

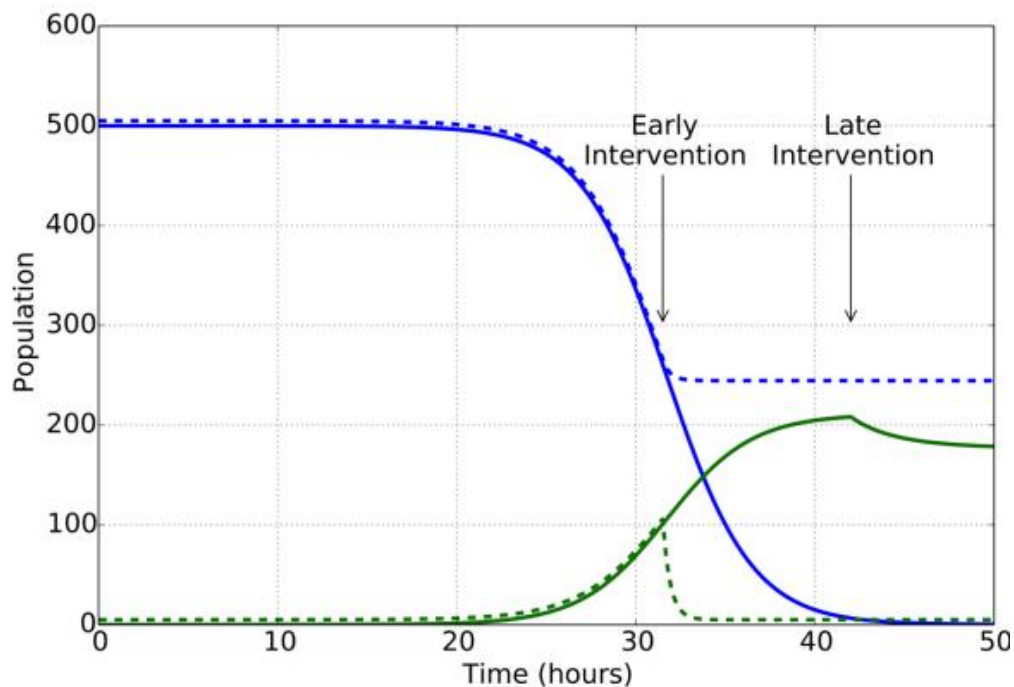


Figure 16. Simulation of Infectious Disease

New York City is a prime site for this observation for a multitude of reasons. New York City, as mentioned earlier in this paper, is no stranger to turmoil. Where all cities have their share of disasters New York's character is unique in that it rebuilds and survives faster than any other city. "But the traumatic '70s – which reached a low point in 1977 with a citywide blackout and the existence of terrorizing serial killer Son of Sam – actually drove down rents for once. It helped to nourish an exciting alternative culture that staged performances in abandoned schools, opened galleries in unused storefronts and breathed new life into the hair-dye industry." (Burrows) So it stands to reason that while it may seem optimistic, perhaps even naïve, to think that in the apocalypse people will just start anew, it is possible. Yet in a city that has experience in recreating itself, it seems less "theoretical" and more realistic.

The New York borough of Manhattan was chosen for this thesis, it is one of the only cities to have actually created a legal plan for an apocalyptic event. In this plan Manhattan is to be completely cut off from the world, complete isolation. This is not only preferable for this thesis but necessary. If isolation is the prime physical condition for survival, then the city must also be chosen based on physical conditions. No other city in the world is more physically isolated than New York. While it has many bridges and tunnels, it is still simply an island, and with transportation networks removed it is easily contained, with its physical boundaries of water.

Other factors have also directed this decision; varied population, density of inhabitants, unique character of neighborhoods, variety of building typologies, and Central Park providing a large natural zone within this dense metropolis, New York provides a prime incubator for the development of new communities, new survival

systems and controllable observation. While it may be beneficial to observe and design for every borough and neighborhood, for the sake of control we will focus on the Upper West side, with specific attention to different buildings based on their typologies.

Whereas one of the most challenging aspects for a project such as this is the speculation as to how the general public and the government for that matter will react. However, in the spirit of leaving as little to speculation as possible we will be using “The New York Public Health Manual” as the basis and framework for deciding how the government and infrastructure will look in the aftermath of the grand event. Written by a collection of lawyers, judges, doctors and public health officials the goal of this document is to provide a legal framework for running New York City amidst all the chaos and panic. One of the creators, Chief Judge Jonathon Lippmann, prefaces this document by saying “While it is impossible to predict the timing or severity of the next public health emergency, our government has a responsibility to anticipate and prepare for such events. An important element of this planning process is advance coordination between public health authorities and our judicial and legal systems. The major actors in any public health crisis must understand the governing laws ahead of time, and must know what their respective legal roles and responsibilities are.” (Coldner)

While the focus will be the implementation of new systems, communities and social roles it still remains relevant to understand the government’s role in this new city. The government in place and any infrastructure remaining can only be a weakened remnant of what was in place before, even a weakened governmental body can assure that some semblance of law and order remains, ruling out the scenario of a war-torn landscape with tribes of fearful marauders fighting for scraps. This allows for the

decisions of whether or not the government is able to prepare ahead of time, thus allowing for certain needed resources to be provided after the city is shut down. Where it is completely unrealistic to expect the survivors to find farm animals and then raise them, with government preparation it would be possible to have the necessary supplies and knowledge to develop and implement new systems for agriculture, waste control, etc.

The New York City Public Health Manual does not completely spell out a happy and unaffected existence. It is clear that the government has placed all its priorities on the greatest number of people surviving well over individual rights and happiness. In fact, the hundred plus pages of new ordinances and procedures in the manual paints a harshly dystopian image, much like Orwell's 1984. What does this mean for us observing? I posit that we cannot simply wait for the benevolent hand of the government to save us.² We should prepare to survive and rebuild on our own...or more accurately within our own community cell. While it is fruitful to read the entire document itself, below are some elected ordinances which show the government's commitment to survive, as well as some prime examples of the much harsher attitude it will take to achieve this:

Ordinance 1.11

"The federal government generally leaves to the states regulation of public health issues through the exercise of the police powers of the individual states. The federal government controls movement of persons into the United States to prevent the spread of communicable diseases and may control persons "moving between states" for that purpose." (Coldner)

Ordinance 1.44

”The commissioner may order the removal and / or detention of such person or of a group of such persons by issuing a single order...Such person...shall be detained in a medical facility or other appropriate facility or premises designated by the commissioner.” (Coldner)

Ordinance 1.96

“Subject to the state constitution, the federal constitution and federal statutes and regulations...the governor may by executive order temporarily suspend specific provisions of any statute, local law, ordinance, or order, rules or regulations, or parts, thereof, of any agency during a state disaster emergency. (Coldner)

Ordinance 1.101

Allocation of Resources in Disasters

“In serious health emergencies, this most likely would involve a triage system that balances the obligation to save the greatest number of lives against the obligation to care for each single patient.” (Coldner)

Ordinance 1.105

“The public readiness and emergency preparedness act provides a wide range of persons and entities, including governmental entities and public health workers, with broad based immunity from claims arising from the production and use of “countermeasures.” (Coldner)

Ordinance 1.117

If an emergency or other exigent circumstance or the imminent threat thereof prevents the safe and practicable holding of a term of any court at the location designated by law therefor, then the governor may by executive order appoint another location for the temporary holding of such term if it is a term of a trial court. (Coldner)

1. With proper quarantine and isolation from the world, there is data to suggest that infection would no longer remain a concern. If this quarantine was broken though, even momentarily, then the spread of disease would occur even faster.
2. While not implying that disaster victims rely on the government to save them, there is usually a time frame in which the world will “return to normal.” Not in this scenario though.

CHAPTER 4

FRAMEWORK

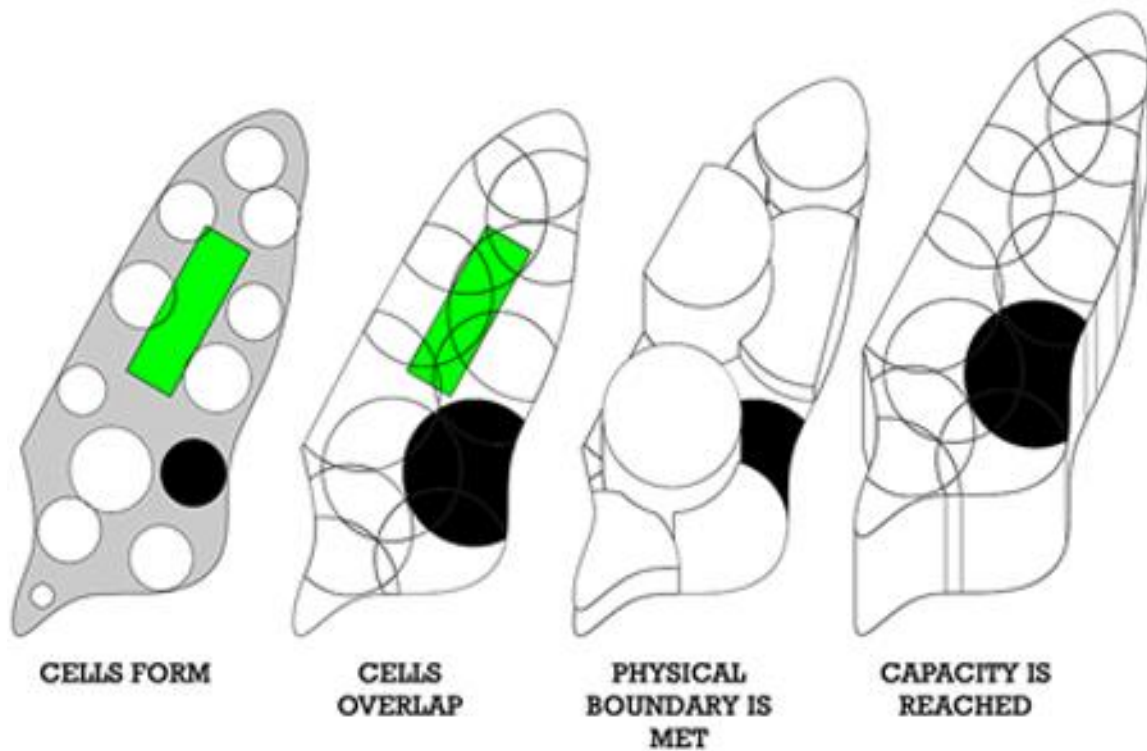


Figure 17. Nature as a Physical Boundary

After establishing the disaster scenario we will explore, and our site, we must decide on what we actually need to examine. As stated before, what is required is a new set of systems, as well as a framework for designing a new city. We also have to begin analyzing this process from the micro scale all the way to the macro scale. We will examine this process at three scales; the scale of the individual's need for survival, the systems required for physical shelter and the development of community, and finally the creation of the new dynamic city as a whole.

Our first priority is to develop the necessary systems for the individual to survive, much like a garden requiring seeds to flourish; this new city will require inhabitants to

develop. This is examination of survival at its basest, so the question is...what do humans need to survive from day to day? In regards to this thesis; the answers are food production, water collection and filtration, waste control and some notion of power generation. In the spirit of developing true adaptation to the apocalypse as opposed to simply surviving we will also attempt to further elaborate on these systems in the hopes of creating a closed loop, self – sufficient system of living.

Perhaps the most important, as well as most challenging in this apocalyptic setting, is the concept of food production. Whereas disaster movies depict lone survivors scavenging for nourishment on a daily basis this project's focus will be the development of a stable and manageable agricultural methodology. As mentioned before, New York City does not have plentiful space for crops and lack of farm animals to domesticate. What this means for us is that while some small scale gardening will take place throughout the city it is by no means the answer to our dilemma. What we will need are systems which can be operated without power or large spaces of land.

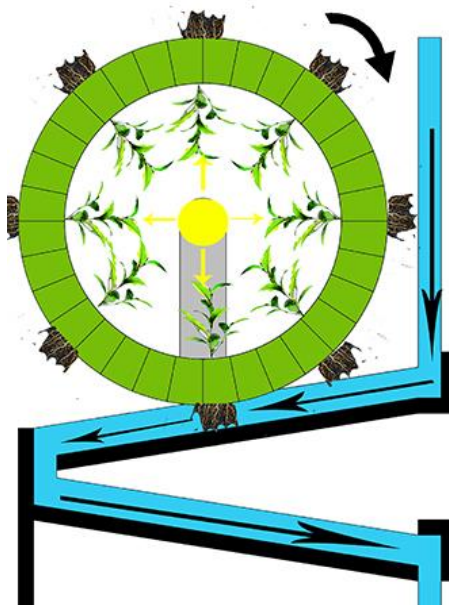


Figure 18. Geotropic Food Cylinder

The first system of food production we will examine is Hydroponics. A simple explanation of Hydroponics is the growing of different plants with limited space, and without the use of soil. Almost all variations of this system require two ingredients, water and gravity. We assume that water is not a difficult resource to obtain, the environment is unaffected by the disaster so therefore it will still rain, although this will require collection and filtration. Where this system begins to flex its advantages is the idea that a very dense amount of planting can be achieved in a small, indoor space, which the city's many buildings are in no short supply. However, what is usually seen as a “byproduct” of this process actually begins to form the pieces to our puzzle of food production. As the water filters throughout the plants and then drains it becomes very oxygenated and fortified, which actually helps fish thrive, providing us an opportunity to discuss the next piece of this puzzle...Aquaculture.

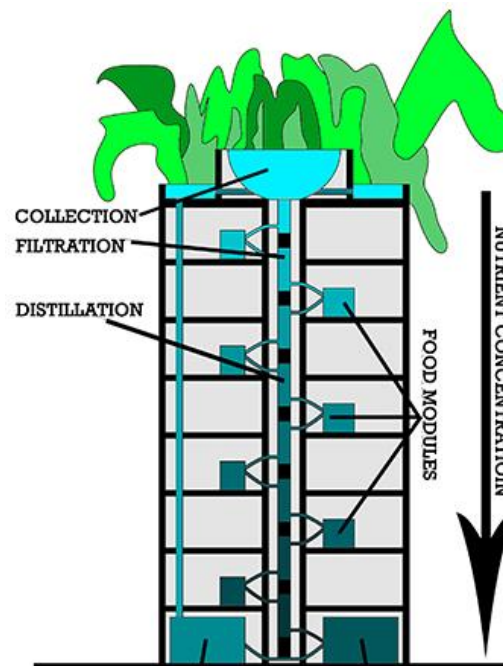


Figure 19. Filtration of Water through Food Modules

Where we assume New York has no large farm animals to sustain us we can assume that we have access to fish, whether it be the government's early preparation or our own ability to find them through local water sources. Aquaculture is the system of raising fish simply through the use of water tanks flowing downward with the use of gravity, all this system requires is filtration of waste, the addition of oxygenation and some kind of nourishment for the fish. While these are downfalls of this system they are easily solved with the addition of the previously mentioned system of Hydroponics. The oxygen rich water from the Hydroponic runoff will help the fish thrive, as well as the nutrients from the runoff actually feeding the fish. What begins to complete this cycle is the waste from the fish actually providing nourishment to enrich the plants of the Hydroponic system.

While both of these systems can be very useful in providing food, even being able to shrink or expand in scale with different sized groups of survivors, their true success lies in the combination of both, allowing each to feed off each other and improve their output. However if this combination was expanded upon as the new city is built can it be implemented in some of the larger buildings in the city? To answer that we look like at a system somewhat more conventional, vertical gardening. Allowing gardens to be planted on large vertical surfaces, this solution was tailor made for dense cityscapes. With prime access to sunlight, easier water management with gravity forcing water to filtrate throughout. It also has the unique quality of not only healing the building but allowing for a rehabilitative natural aesthetic to the building. Its downfalls also become apparent when examining it. Vertical gardens, particularly at a larger scale, are not as simple to construct

as a post – apocalyptic setting would allow. The other downfall being that it requires a decent amount of water to filtrate through the plants.

While it does not seem applicable for our scenario to plan for vertical gardening, by combining it with the other mentioned food systems it can become practical by removing some of its downfalls, but also allows for the expansion of any food system to accommodate some of the high-rises or larger buildings in the city. If applied to larger building it allows for much larger food production, and when it may seem daunting for the required water to run throughout it feeding the plants this can also be solved by combining all systems. By treating this with a modular attitude and handling each floor as a module for food, one combined system of Hydroponics and Aquaculture (Aquaponics) on each floor will not only provide food, but if each system is connected the filtration and flow of water through each module can also be used for the vertical garden surface. This will create a large sustainable source of nourishment; plants, nutrients, fish and if filtered properly water itself, not to mention the aesthetic qualities of a vertical wall system, such as the healing properties of green space, and even physical qualities as well; shading, water collection and sealing of derelict building envelopes.

If we gain a handle on how to provide food after this disaster we have another obstacle to face, how to obtain water. With the apocalypse, gone are the days in turning on a faucet and its infinite and clean source of water pouring out. In this new city any water system will primarily be composed of two phases; collection and filtration. It is not a novel or revolutionary concept of collecting water, history has seen developed humans performing this since the dawn of time. In fact New York City has thousands of

opportunities for rainwater harvesting, so as long as they are maintained water collection should not remain a challenge.

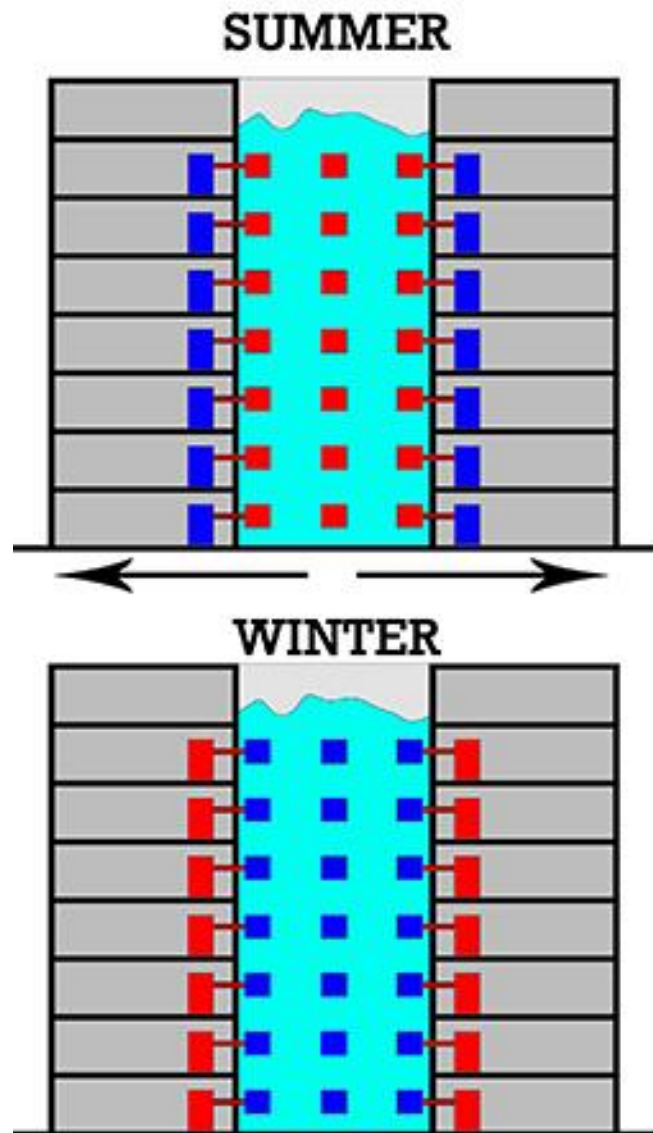


Figure 20. Transfer of Heat from a Central Water Source

While collecting the water is not a challenge, using it is where the difficulties remain. Rainwater is cautiously safe to use, not so much to drink...however when in the context of a dense urban area, such as New York City, rainwater runoff from any paved

surface such as asphalt the water is no longer usable, it may in some cases become toxic.

Filtration may seem like a tedious process in our modern world, however it stands to reason that when the world ends, it not only becomes vital for survival, but also infinitely more challenging. All is not lost though, filtration is still possible in this new world, and if dealt with systematically like the previous systems it can even become a stable aspect of our post – apocalyptic life. Water filtration is a series of six steps...

- 1) Collection
- 2) Initial Filtration
- 3) Coagulation
- 4) Sedimentation
- 5) Distilled Filtration
- 6) Disinfection

Collection, as discussed previously, is as simple as some kind of cistern or container to collect any rainwater. Initial filtration is the process of removing any visible debris that may have been unintentionally collected, like the collection phase this is also a simple solution. Simply pouring the water through mesh will only allow for water and smaller particles to pass through.

Coagulation is where the difficulties in this process begin to emerge. Many may not even be aware of this stage of water filtration in their day to day life; however it remains one of the most vital in the entire process. Coagulation is the addition of minerals to collected water to create a chemical reaction which attracts any remaining impurities

and clumps them together, allowing for easier removal. While this sounds difficult to achieve in the apocalypse it can still be achieved with everyday objects. To achieve this step most effectively simply adding aluminum shavings to water will accomplish this coagulation. It may be naïve to assume everyone has access to spare aluminum, not to mention the means to shave it, but this too can be overcome by simply adding iodized salt instead, (table salt) it is not as effective but still successful enough to begin the process. (Nearing)

The sedimentation phase only requires time and that the water is left to its own devices. As the chemical process of Coagulation finishes the clumps of impurities will settle to the bottom of the cistern. These can then be removed manually, with a sterile device, or left to be filtered through the Distilled Filtration phase. The second filtration phase is identical to the first phase, albeit with a much finer mesh this time. Besides the clumps of impurities this phase removes microscopic particles still left behind.

The final phase of filtration IS the most important step of the six. If not completed the water is still unusable, even if it does appear clear and safe. This phase has always been accomplished with the boiling of water in modern times chemicals are also added to increase the speed and efficiency of this process. Much like Coagulation we may not have access to a variety of chemicals, yet even if we have any chlorine (Left over from swimming pool owners and users) this process is improved. Even without any chemicals though boiling the water is still effective enough to create safe water.

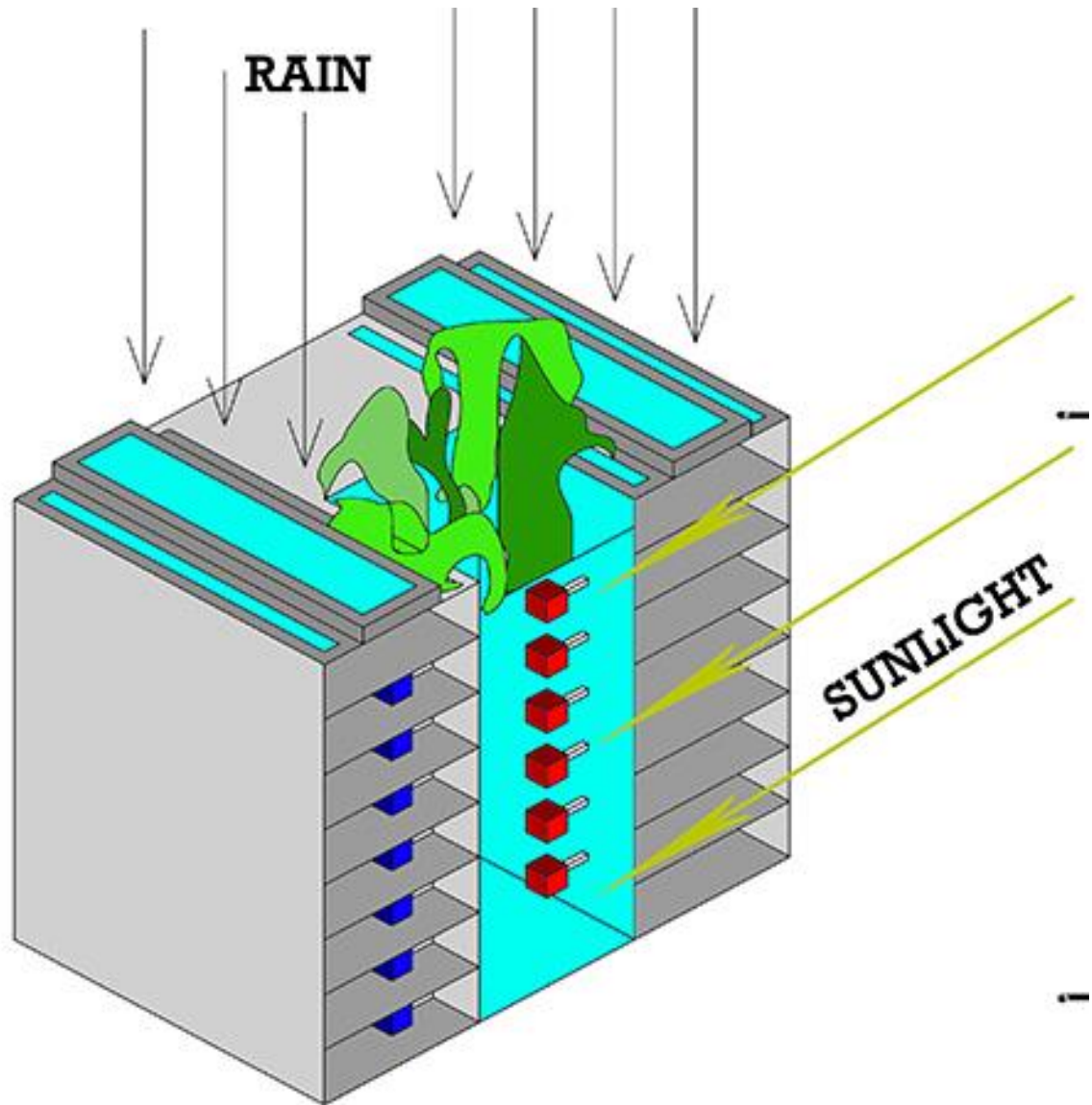


Figure 21. Central Water Source as Food Habitat

After we have a steady supply of food and water what is next for us to struggle and stress over? An aspect of our lives that we not only depend on infrastructure to handle, but also have very little experience with dealing with at all, let alone the ability to even discuss it without awkwardness...human waste. Even more unsettling than our uncomfortable relationship with it is the fact that if left unchecked, an entire city of

inhabitants not properly dealing with their waste will without a doubt be the second devastation of the city. After large scale Contagion we are already at increased risk of infection and disease and mismanaging human waste becomes a catalyst for disaster. But until some semblance of public infrastructure is restored (Or recreated) this problem cannot be ignored, it must be dealt with.

The solution is a process called Anaerobic Digestion. The obvious answer would be to use our human waste for fertilization for our crops, however as previously discussed we will probably not be relying on traditional soil planting, so this not only isn't relevant but even the small amount of soil throughout the city will not be a fraction of what is required to provide adequate disposal. Anaerobic Digestion not only provides a system to deal with human waste, it also provides the potential to create power, which will be discussed shortly. The only materials necessary for Anaerobic Digestion is a large airtight cistern and if converting waste to power the means to transport the biogas. The cistern may provide a dilemma, particularly if one is not accessible; but this can be created with a large concrete container and a plastic liner to create an airtight enclosure. Like water harvesting all Anaerobic Digestion requires is for the catalyst (Human waste) be collected in the cistern and time for it to undergo the chemical process. This chemical reaction has four steps in two phases; phase one consists of Hydrolysis and Acidogenesis, phase two consists of Acetogenesis and Methanogenesis. After time has passed, and the waste has undergone all four steps there will be two by – products, methane biogas, used for power, and nutrient rich liquid, used for fertilizer. (Seymour 1976)

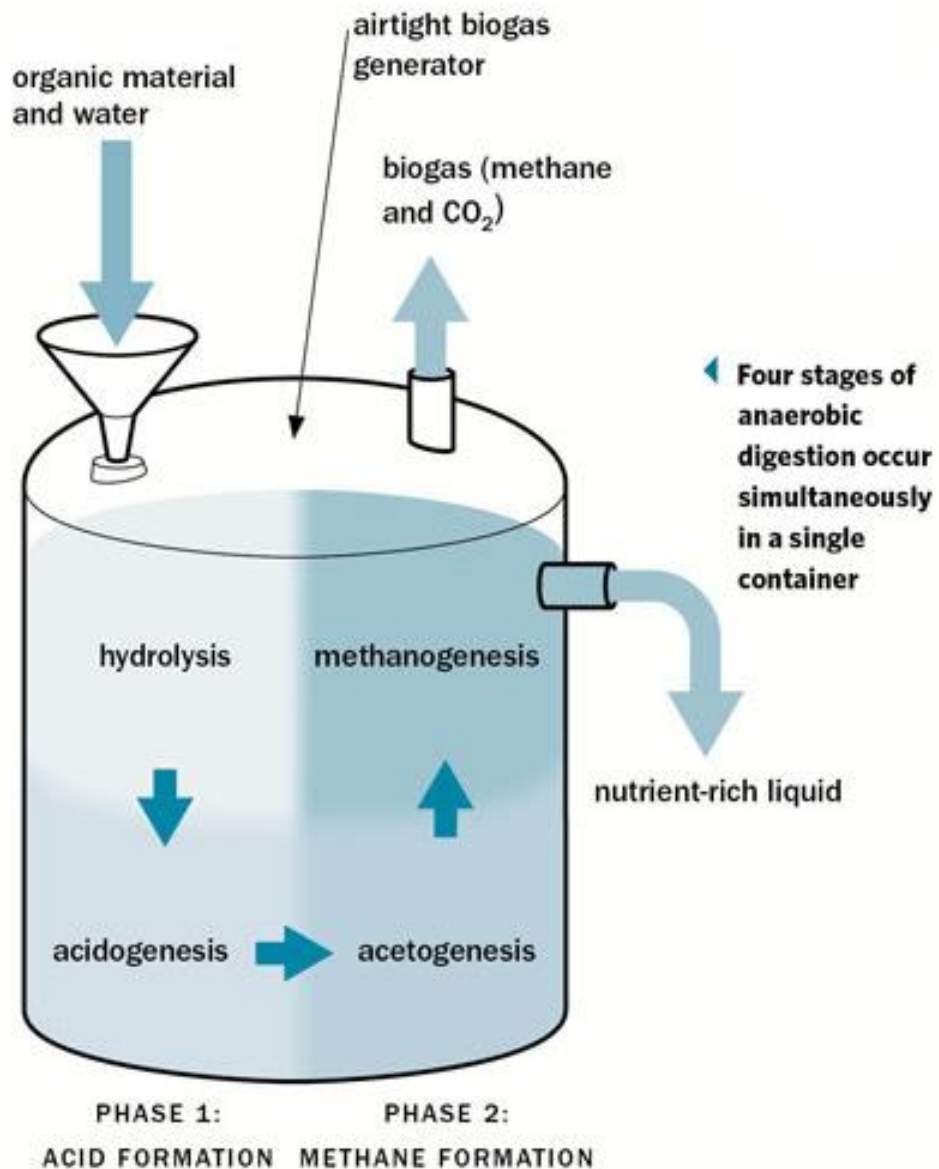


Figure 22. Diagram of Anaerobic Digestion

After we have sufficient systems in place to deal with our waste we can then elaborate on them to actually provide us with a means for power. The biogas that this process creates is actually clean burning fuel which can be utilized wherever propane or natural gas would be used. This presents us with an opportunity to actually cook our food and even use generators and converters from our past to potentially provide electricity.

Warren Weismann writes that not only is biogas 60% efficient, compared to the 10% that our current biomass cookers achieve the ratio of biogas to our everyday needs is very small. It is estimated that the daily waste of three people will provide enough electricity and cooking gas daily to cook three meals for all three people and to provide lights for two rooms, the real potential in this system is that as the number of contributors rises the energy output raises at a greater rate...eventually creating surplus energy.

Another option for power generation is the current “poster – child” for sustainable energy, windmills. Much like water as a means for power generation (Another potential avenue to explore) windmills, when turned by prevailing winds move an attached belt which generates electricity as it rotates. Another mechanism which mimics this process is a car’s alternator, which is also what provides us the opportunity to create this wind generation system, even with limited resources and materials. If the windmill fan blades are attached to this alternator (Cars will no longer merit a place in the new city due to lack of fuel and the new roles of the road network) then the alternator itself will generate power as it rotates. This method however requires a little more time, maintenance and mechanical knowledge, as well as lacking the benefit of removing our waste. It does have the potential to eventually be elaborated on with the previously mentioned biogas fuel, increasing power yield and efficiency. As time passes more and more systems can begin to become implemented to begin our slow climb back to luxury and surplus resources, electricity being one of them.

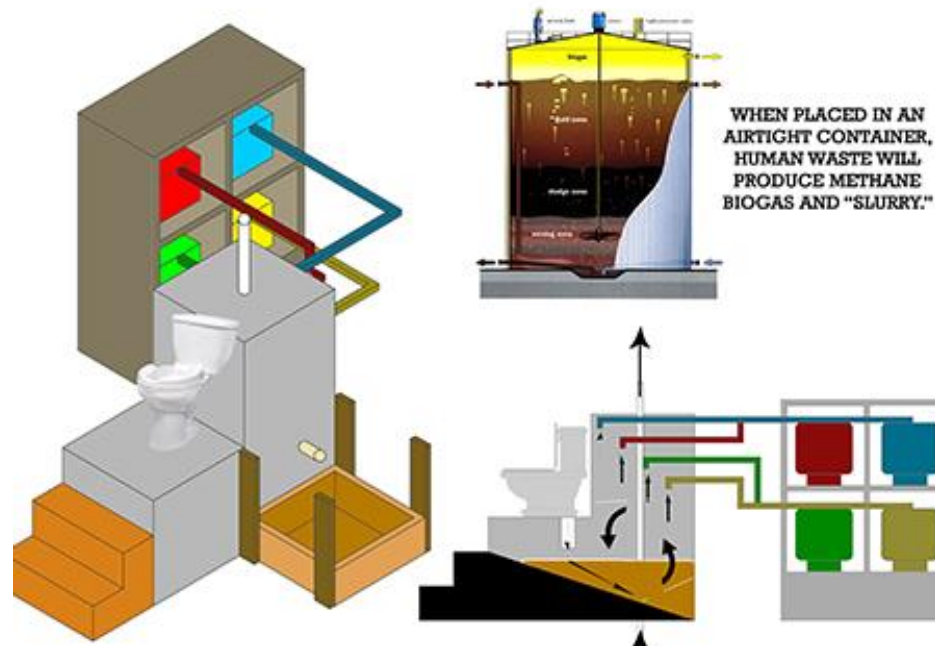


Figure 23. Storage of Biogas / Conversion of Existing Toilets

With a source of food, water, power and even a means to control waste survival no longer seems challenging; in fact it appears life can begin anew. Yet, we are not aiming to simply having our basic needs met, we are planning on creating a new self – sufficient city. This will begin with creating a closed loop system which not only encompasses all our necessary systems to survive, but also the ability to be treated modularly throughout the individual cells of the city. This is not as daunting as it may sound, close examination through each individual system shows that they already begin to have many overlaps and potentials to combine with each other. The figure below shows that when all four systems are combined (Food, Water, Waste Control and Power) each system's outputs will not only satisfy our needs, but will also satisfy the other systems' necessary inputs and vice versa...a truly closed loop, self – sufficient city, all of it possible to create even in the post – apocalyptic setting we so often fear. This closed

loop system is something we have not achieved, even in our technological and informational golden age; this can only prove one assumption. Utopia is not at odds with the Apocalypse...it can only be achieved in the Apocalypse.

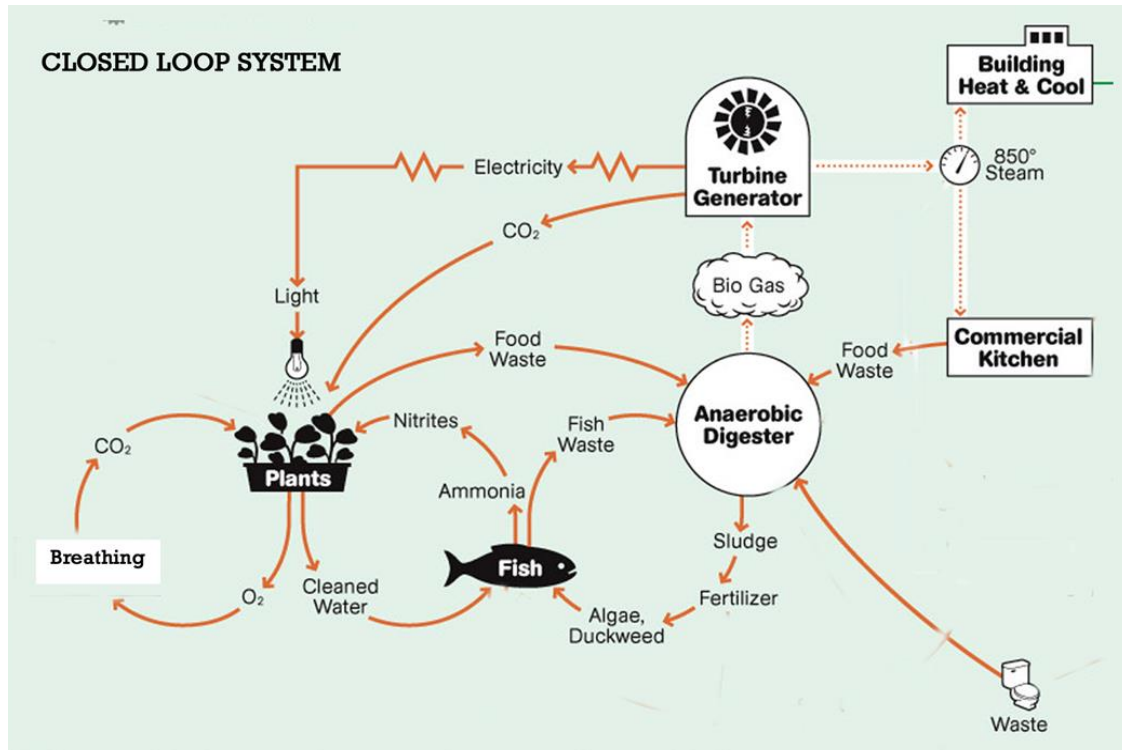


Figure 24. Closed Loop System of Survival

When we've met all our needs and have implemented the means to control, create and manipulate our necessary survival systems the next step in achieving Utopia is to move on our physical habitation and the development of communities. However, when we no longer have the comforts of government and infrastructure to cling to, how can we and our buildings function in their new crippled mentality? In order to gain some insight into how a building would function in a post – apocalyptic city we look again to The Tower of David in Venezuela. With over 3,000 residents living there without power, running water and any government regulation there is no better example of living in the Apocalypse than this modern day skyscraper. After studying The Tower of David we can distill five

conditions that the building and its inhabitants must respond and adapt to in the Apocalypse.¹

- 1) Rooftop / Streetscape
- 2) Security / Community
- 3) Bartering / Communication
- 4) Vertical Cores / Vertical Transportation
- 5) Natural Elements / The Exterior World

As mentioned before the streetscape will adopt new roles as the network of roads and roles of automobiles begin to shift. The same will go the rooftops of these “shells” as well. Not only may the roof be used for functions that may not be as secure as the ground level, (Gardening, private functions / gathering, etc.) it can also treated as a hub for both exchange and travel between any other buildings adjacent. Regarding the previously discussed survival systems these rooftops also provide prime real estate for some of these necessary systems, including rainwater harvesting, methane biogas collection and optimal exposure for windmills and other power generators.

One of the actual observable cases of human beings bonding together in hardships, opposed to the stereotype of becoming savage combatants, can be seen directly in The Tower of David. Despite having or public officials or any government intervention whatsoever the inhabitants of The Tower have not only formed counsels, but have taken it upon themselves to create a physical barrier around the building as well as monitoring the building intensely. Another notable aspect of The Tower is its infamous refusal to

allow outsiders into the building, after a week long campaign of removing any drug dealers or any other malefactors residing, displaying the concept of Defensible Space to its highest order. This system of self-governing and self – policing will also have to carry over into any building with multiple residents in this new city.

After survival has been secured, and the city and its inhabitants begin to move forward in the direction of developing their settlements and communities, a system of communication and bartering will eventually need to be created. Communication will be necessary for the individual cells to form a unified and dynamic city. Bartering will need to be developed at both scales of the separate shells themselves and between the community cells as a whole. In The Tower of David unofficial services are provided and bartering is the economy due to the overall lack of currency. Every few floors there are restaurants, mini food markets, even unlicensed dentists providing everyday services to the other residents. This same model can be applied in the Apocalypse, in a city as large and diverse as New York City will provide as diverse a population, with a wide range of skillsets and job specialization. At the macro scale, the bartering between the cells of the city will allow for any surplus of resources to be bartered to help any struggling cells. Communication can also be created, even in some of the larger buildings, using “primitive” methods if need be. Hubs of communication can be established in each building (Every few floors if the building is large enough) with literal “lines of communication” between each hub, allowing parcels of information to be passed along the line with nothing but gravity. (Much like a cashier at a restaurant hurling a pinned receipt to the kitchen on an angled clothesline)

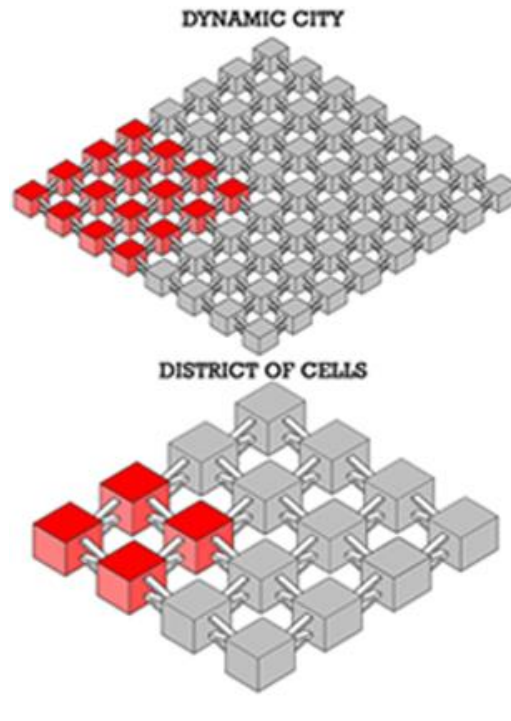


Figure 25. Modularity of Dynamic City to District of Cells

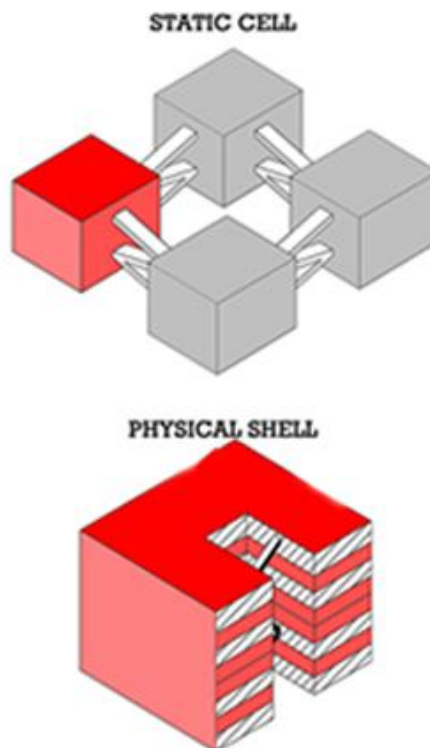


Figure 26. Modularity of Static Cells to Physical Cells

Even with these buildings retrofitted for survival, and communities formed within each shell there still remains an incredibly daunting obstacle within these newly formed structures...vertical transportation. Without a large scale network of electricity (Biogas is very effective, but nowhere enough to power an elevator for a building) elevators no longer exist, leaving behind multi-storied hollow cores in these buildings. These cores are not without their uses though, any of the previously discussed systems (Or all of them) can use these cores, whether it is water collection, an avenue of communication between each of the floors, etc. This still leaves a staggering concern though, are a building's inhabitants supposed travel up sixty floors? The simple answer is...they don't, this could mean that when people are settling into their homes (Or remaining) they will only populate the lower floors. In The Tower of David there are no residents past the 28th floor, despite having over fifty floors to inhabit, however like The Tower as the population of the building grows, newer residents will have no choice but to lay claim to the upper floors. This could also mean that when people settle in their home, they don't leave. Forming "mini communities" within the building will place an even greater importance on the development of bartering between floors and the concept of communication hubs. This may seem somewhat absurd, the idea of families living on the 50th floor of a building for their entire life, however traveling more than three floors of a building becomes a nuisance, five floors and it will be avoided altogether.

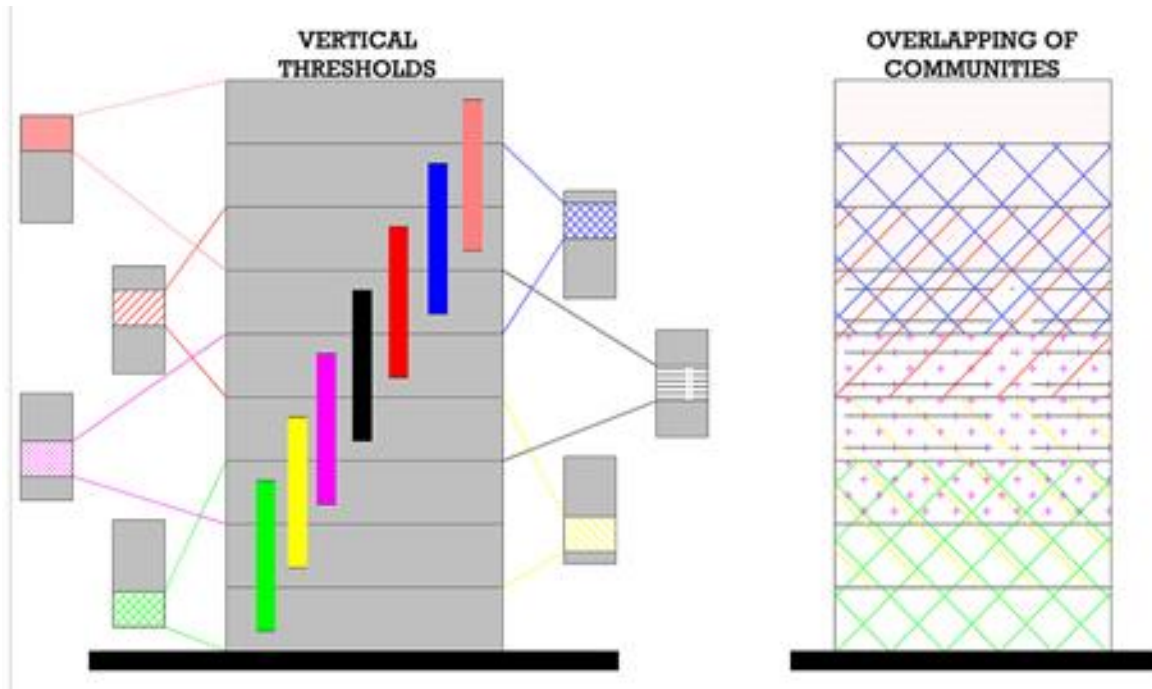


Figure 27. Development of Mini Communities Due to Lack of Vertical Transportation

There are perhaps primitive systems which could allow for vertical transportation, levers and pulleys used in ancient times may allow for some mechanisms to transport cargo, and maybe even people up and down floors. However, this still seems slightly absurd given the scale of some of the buildings people will settle in. Just like communication hubs developing every few floors the same could be created for travelling, moving downward through the building is not as daunting as moving up. If poles are placed through every two or three floors someone could “easily” maneuver towards the ground floor, this however offers no such convenience on the travel up.



Figure 28. Vertical Cores in the Tower of David

The final condition is Natural Elements / The Exterior World. As discussed in the analysis of the chosen disaster scenario Pandemic offers the unique aftermath of leaving the built forms of the city almost completely untouched. Yet while the shells of the city still stand, and offer protection from the elements, time will continue to pass and begin to chip away at some of these structures. With little to no maintenance on these buildings the outside world will slowly become more and more of a problem. This can be solved either by the concept of job specialization or vertical gardening. The inhabitants may be able to monitor and care for the building if any knowledge of such matters is shared among any of them. Vertical gardening also provides a solution to this by covering and sealing any failings in the building shell with its canopy, while green surface can never fully replace concrete it can certainly assist.

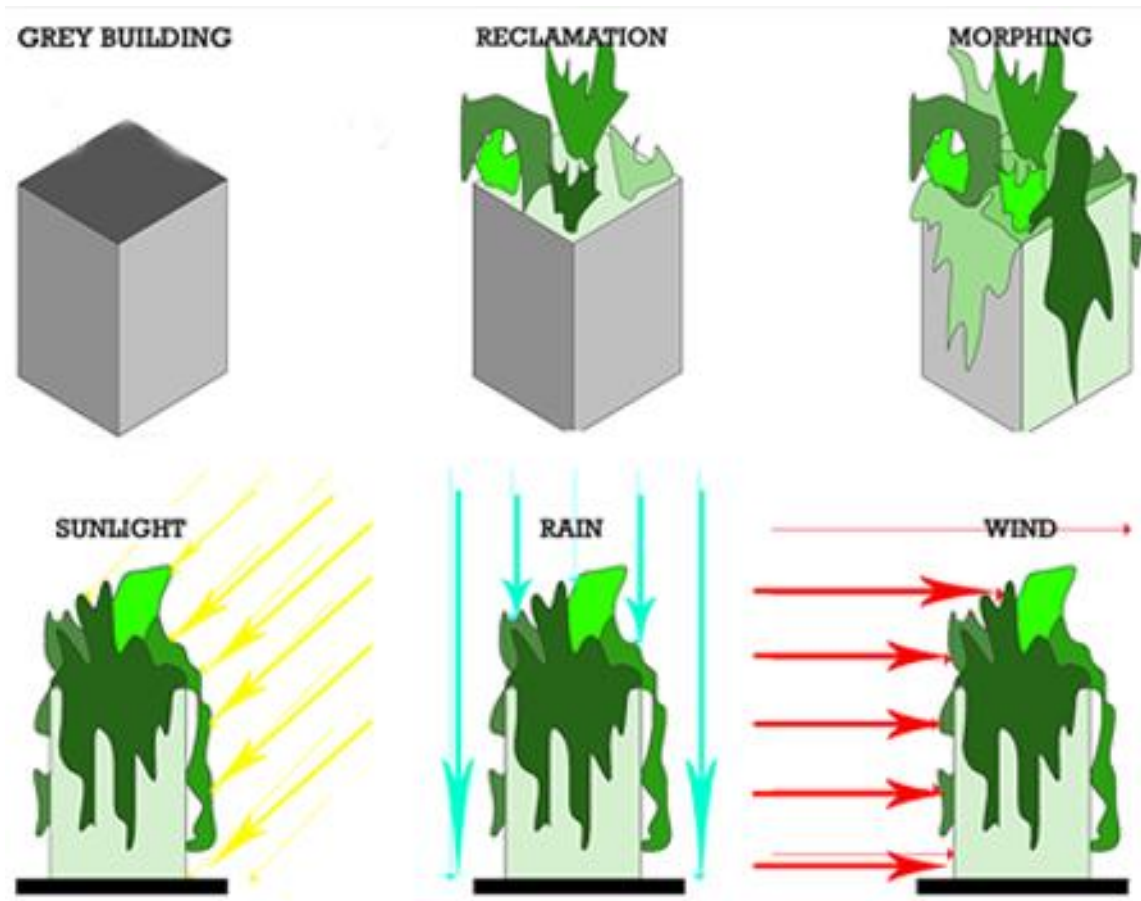


Figure 29. Morphing / Reclamation of Nature

With the individual able to survive, and able to form community within a physical shell the final phase of this observation is of the city as a whole, The Dynamic City composed of Static Cells. With technology completely crippled and the implementation of these new systems we are successful in returning to a successful Entopian city. Whereas Nature was the physical boundary for a city to be built it now becomes the actual city itself. There may come a time again after the disaster for humans to be able to build anew and to expand beyond their boundaries. For the decades after, this is not the case; the city can only be as large as it was before the disaster.

Man can once again feel comfortable and accomplished, despite this new harsher reality. By creating his own systems of survival and being solely responsible he can rejoice in truly adapting. With the development and cooperation of these new communities our daily number of contacts grows again to a healthy amount. We can once again rely on each other to live.² The Shells of the city are now more than structures for people to sleep and store their possessions, they now house the very communities that will define and create the new city, along with a return to function triumphing over ornament, coupled with communication interrelations between other shells.

Where the new city truly becomes a Utopian and Dynamic City is the shift in the roles of the networks. With fuel no longer in supply, cars will slowly cease to function, as will the roads which only exist to map our travels by cars. Being the youngest of the five elements this is also where we gain the greatest potential for the most radical change. Much like the abandoned skyway project of New York where unused overhead train lines become large pedestrian focused green spaces, with our newfound freedom from vehicles perhaps New York's large grid of roads can follow this model. They also provide the potential for the development of a communication or bartering network between the cells of the city.

1. These conditions to respond to are based on accounts of interactions and interviews with the building's inhabitants.

2. While survival as an individual is paramount in this apocalyptic setting, it is impossible to survive on a long term basis without support and community, both for those to depend ON as well as having those who depend on YOU.

CHAPTER 5

APPLICATION / IMPLEMENTATION

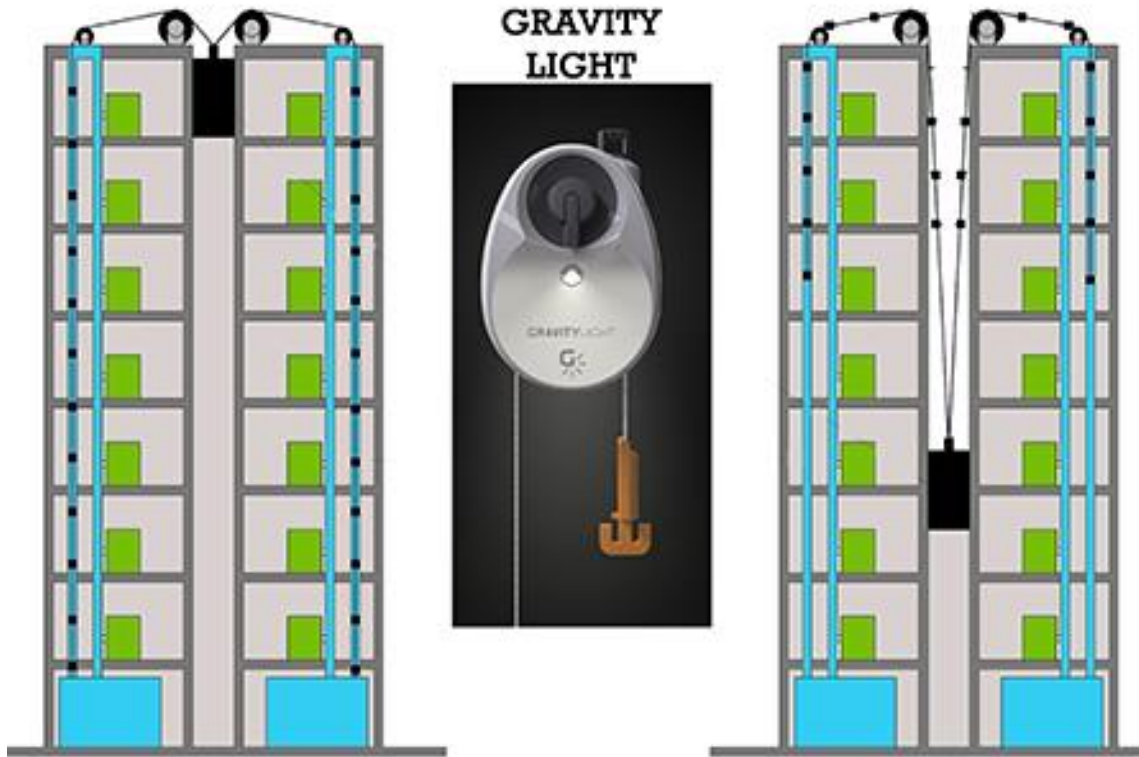


Figure 30. Implementation of Elevator as Power Source

There is no greater variety of building types, functions and styles in any city than New York City itself; with each one providing its own unique set of conditions, opportunities or challenges to overcome when applying this framework of analysis. However, much like when our inability to study every one of the infinite variations of the doomsday scenario the same is true for studying the city. Instead of closely examining every one of the roughly 69,000 buildings that constitute the city, we can observe a broader group of building typologies, covering a large amount of the city with each grouping. (Burrows) For this thesis we will observe three of these typologies; The

Interior Courtyard, defined by its multi – storied walls enclosing an interior courtyard with access to the exterior world; The Interstitial Space, defined by a building composed with disparate masses of varying heights and styles, as well as exterior voids between the forms at the streetscape; and finally The City Block, defined by a variety of buildings forming an exterior boundary with the aid of the New York City grid road system, these boundaries forming a wall around the central nexus.

For each of these typologies we will also observe a specific building, this provides us with a foundation in which to apply any of our new systems or design vignettes to.

While observing The Interior Courtyard we will use The Apthorp Apartments.

Constructed in 1906, The Apthorp is twelve stores tall surrounding an interior courtyard.

When we apply and test our theories to The Interstitial Space we will be observing The Astor Hotel. Built in 1905, this building houses an array of interior functions; ranging from residence, restaurants, theatre and other public amenities. Composed of three main building masses, with transition spaces between each, there begins to form two main courtyards at the streetscape.

After researching individual systems of survival we are also presented with the opportunity to implement some of them on a larger scale with the building shell itself. Regarding waste, the waste of three people provides more than enough energy for that individual unit. If excess energy is produced, then it can be piped into the building itself for external power usage. The same could be said for food production as well. The notion of the building being an aspect of these systems also provides a solution for the most glaring physical limitation in the aftermath, the challenge of returning water to the roof without any power or mechanical systems. This can be achieved with the use of gravity

and syphoning. As the water flows throughout the building due to gravity, the vacuum it will create in theory will provide enough force to create an upward syphoning effect, causing the water to return to the roof.

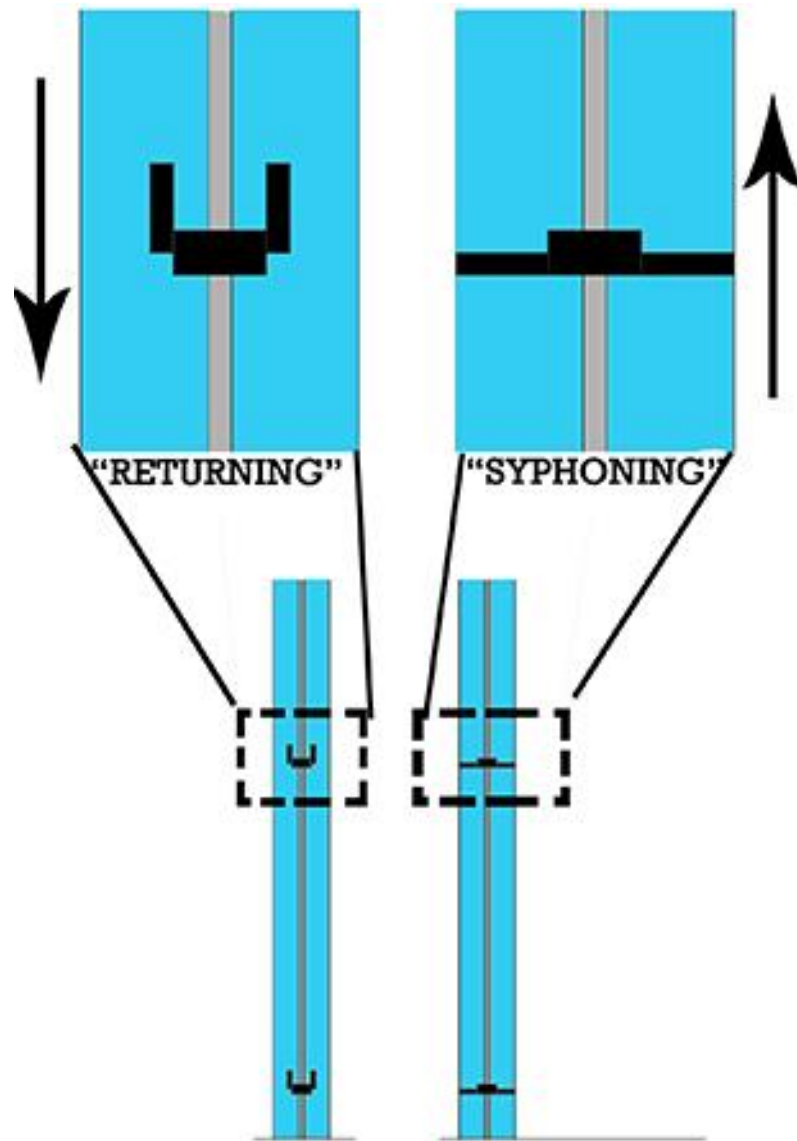


Figure 31. Pressure Seals to Create Vacuuming / Syphoning of Water

This is in an ideal situation of course, which in the apocalypse we can never rely on. So when observing another method of power production we find a backup solution as

well. Created for developing countries, the “Gravity Light” is a simple mechanism that uses weights to create friction with belts, which in turn creates power. While this could certainly be utilized in the units for power it has the potential to be implemented on a much larger scale with the use of the now defunct elevator providing the catalyst for such a contraption. The added benefit of this system is the use of pressure seals in the water system which are attached to the elevator, which uses gravity to pull on these seals, thus creating pressure in the pipes and then assuring a syphoning effect on the water.

For the purpose of implementing the individual systems themselves we will be studying The Astor Apartments (Interstitial Space) as a prototype to allow us the implementation and application of these systems of survival. One of the obstacles with a project such as this (or perhaps a design parameter) is the challenge of developing a system that can easily be deployed, maintained and understood regardless of the inhabitant(s). The solution for this is simple, modularity and packaging. All the required components can be stored three modular containers, each sized about 3’ by 6’ by 6’, a dimension which allowed them to be easily navigated and moved through hallways and doorways. This was however met with a major physical obstacle, with no power in the apocalypse it is impossible to haul three containers up twenty stories to be deployed in the aftermath.

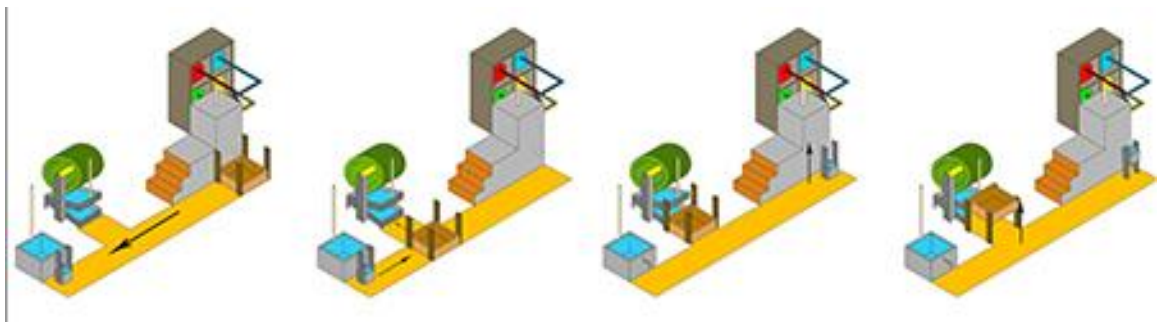


Figure 32. Diagram of Track and Rail Deployment System

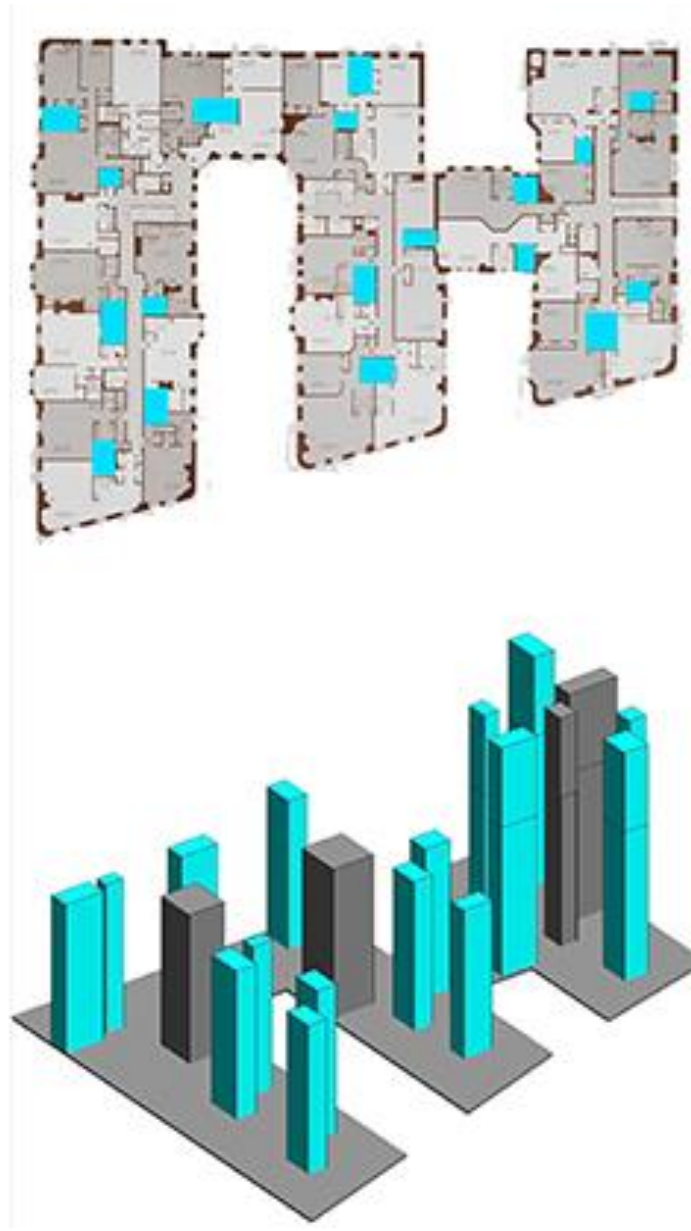


Figure 33. Existing Plumbing Infrastructure of Astor Apartments

This eventually led to the current iteration of this design, with the modular containers being placed and stored in each unit beforehand and then unpackaged leading up to, or briefly after the event. With this is the added benefit of no longer needing to

package some kind of track and rail system to deploy these units, with them already stored in the apartments the track and rails can be installed well beforehand. This can be done with a very simple system of rollers under the floor, which can very easily be exposed when needed, and then simply hidden again when no longer necessary.¹ This roller system will not only allow simple deployment, but can also provide a very convenient system of moving by products from different systems into each other. (Water from the water modular moved to the anaerobic digestion, etc.)

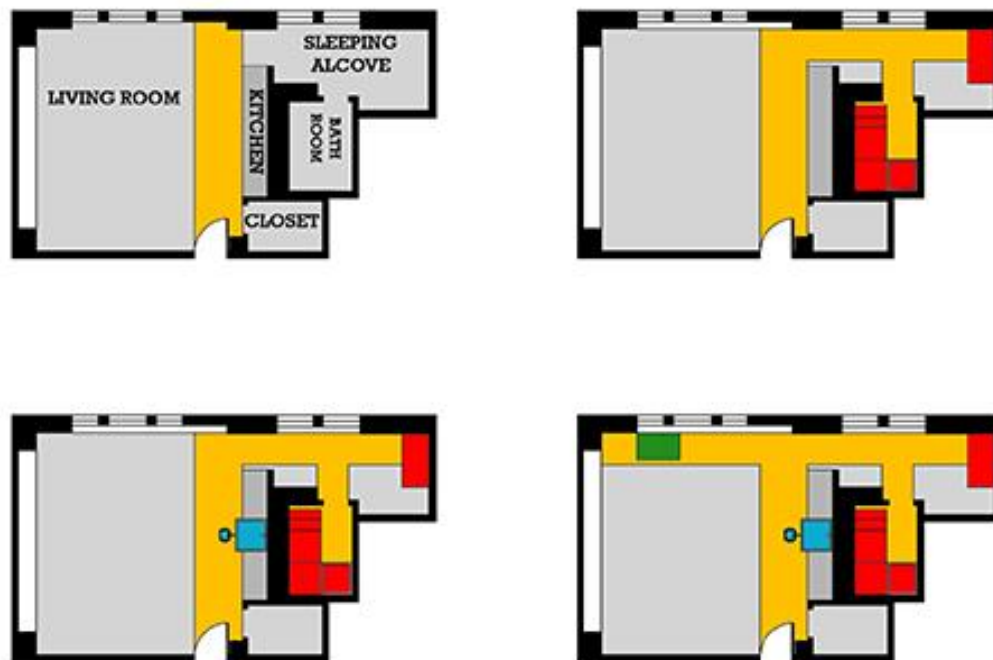


Figure 34. Deployment Diagram of Studio Apartment Unit



Figure 35. Deployment Diagram of One Bedroom Apartment Unit



Figure 36. Deployment Diagram of Two Bedroom Apartment Unit



Figure 37. Deployment Diagram of Three Bedroom Apartment Unit

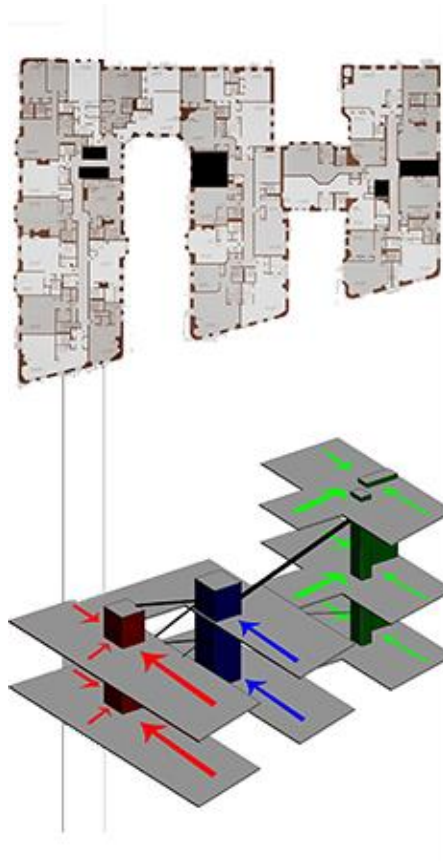


Figure 38. Use of Vertical Cores as Network Hubs

As far as where to store these units, with the tracks already being installed the components of everything else can be stored in less than a 6' by 6' by 6' space. Each unit of the building we observed (Astor Apartments) has a walk in closet/mud room of at least 7' by 7', providing a perfect place to house these units.² While it may seem like a tough sell to convince people to give up their closets for systems they may never need or rarely need, the answer is blunt but simple...There is no more middle class comfort in the apocalypse, only survival.

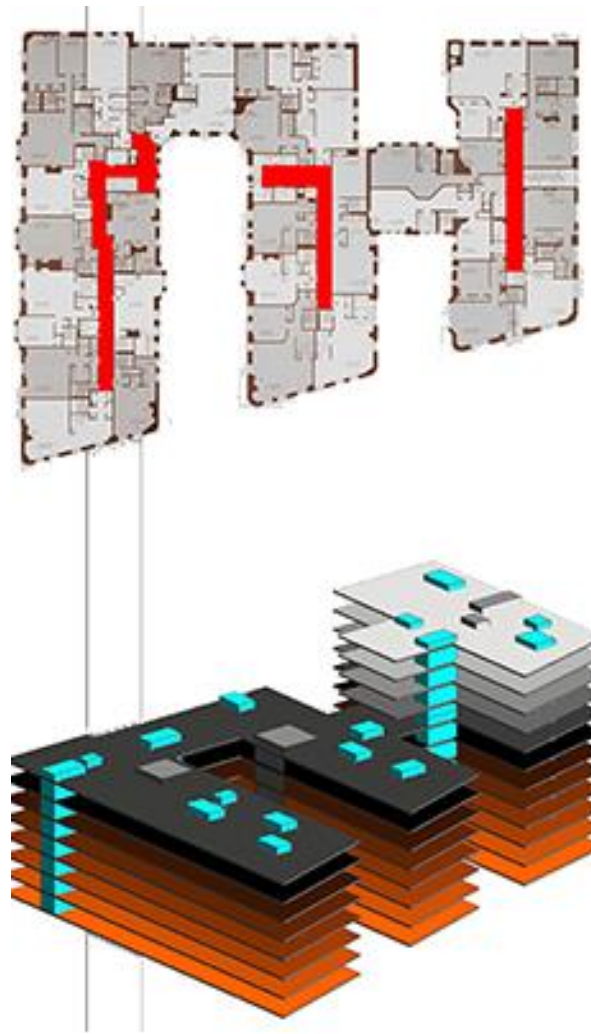


Figure 39. Vertical Thresholds of the Astor Apartments

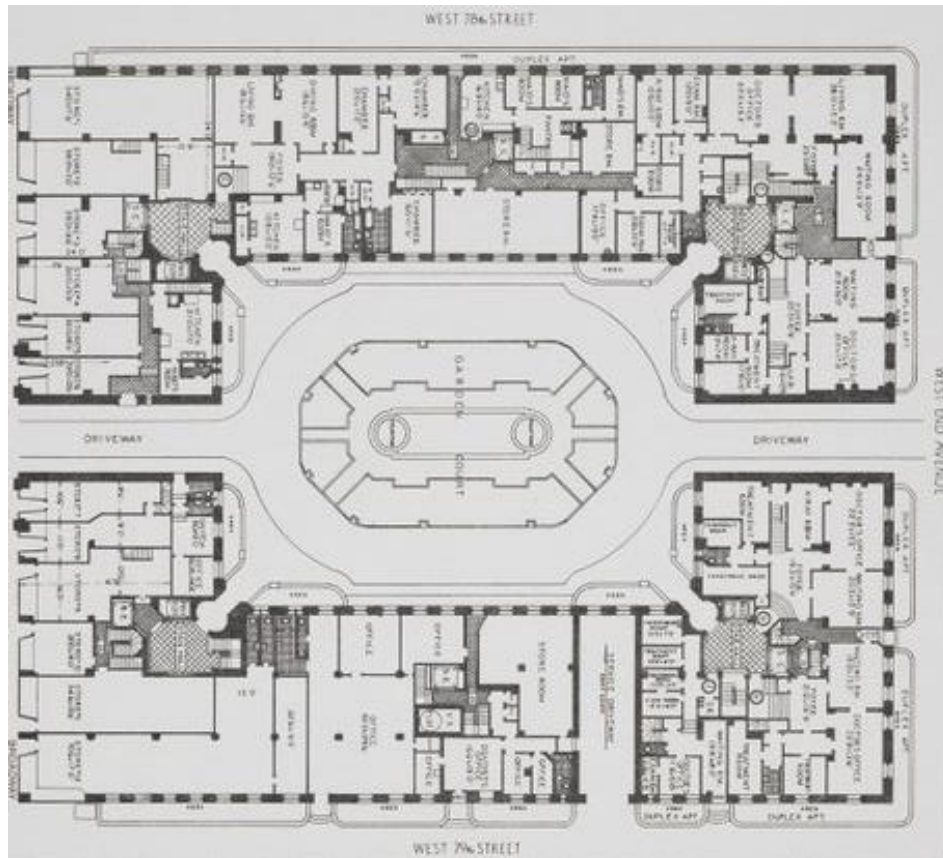


Figure 40. Floor Plan of the Aphthorp Building



Figure 41. View of the Aphthorp Courtyard



Figure 42. Floor Plan of the Astor Building



Figure 43. View of the Astor Building



Figure 44. Aerial View of Amsterdam and 79th Street



Figure 45. View of The Beresford Building

1. This conveyor system is a relatively “cheap” solution to integrate before the apocalypse takes place.
2. The set up and deployment of these individual systems is very straightforward, allowing non-specific storage.

CHAPTER 6

FINAL PRESENTATION BOARDS

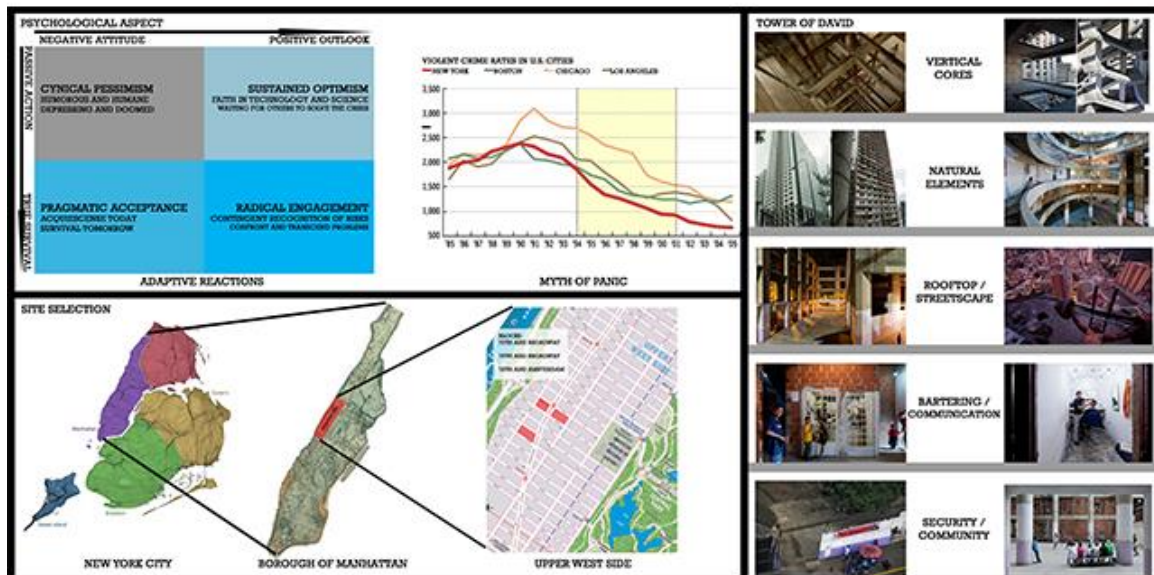
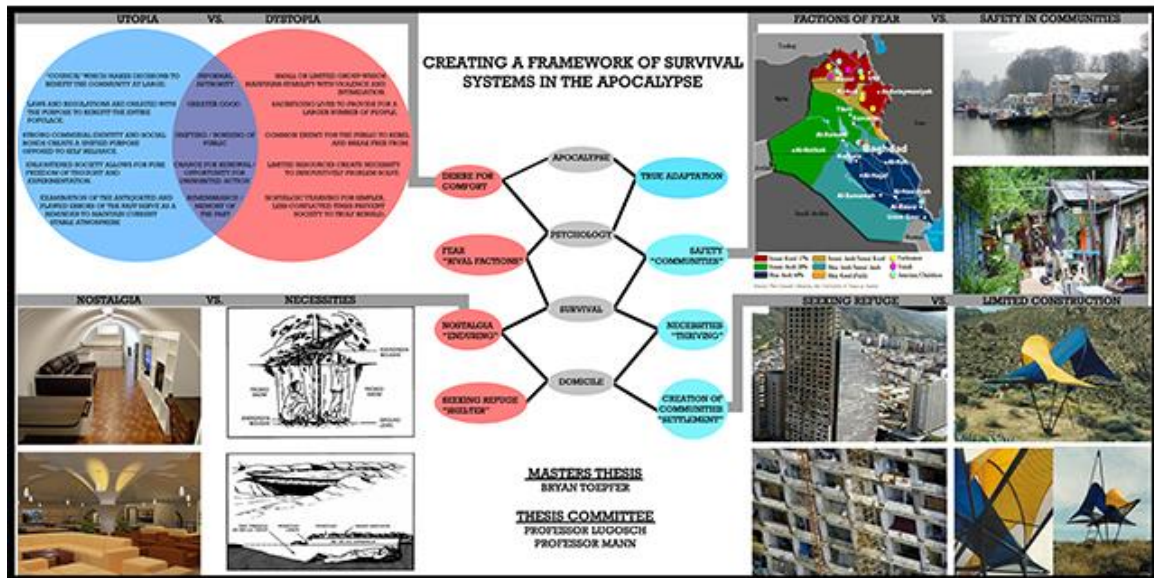


Figure 46. Presentation Boards (First and Second)

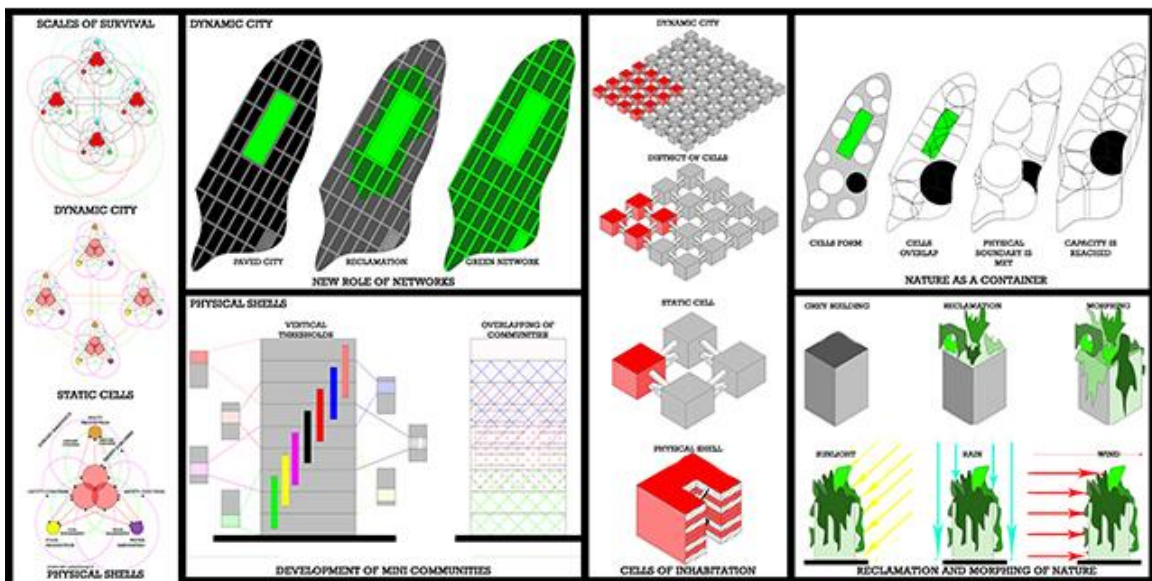
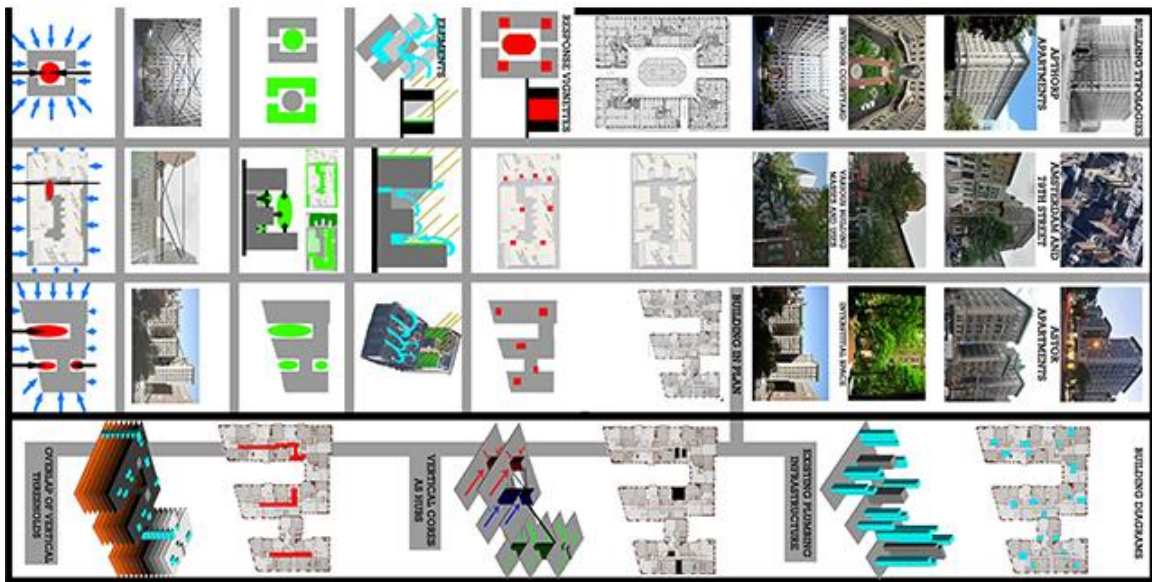


Figure 47. Presentation Boards (Third and Fourth)

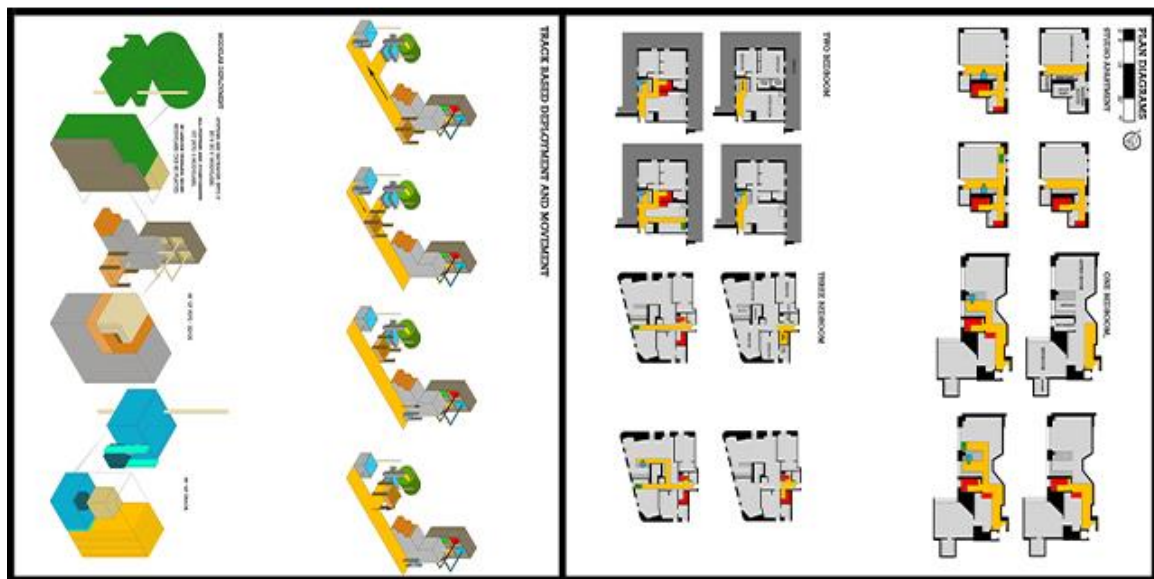
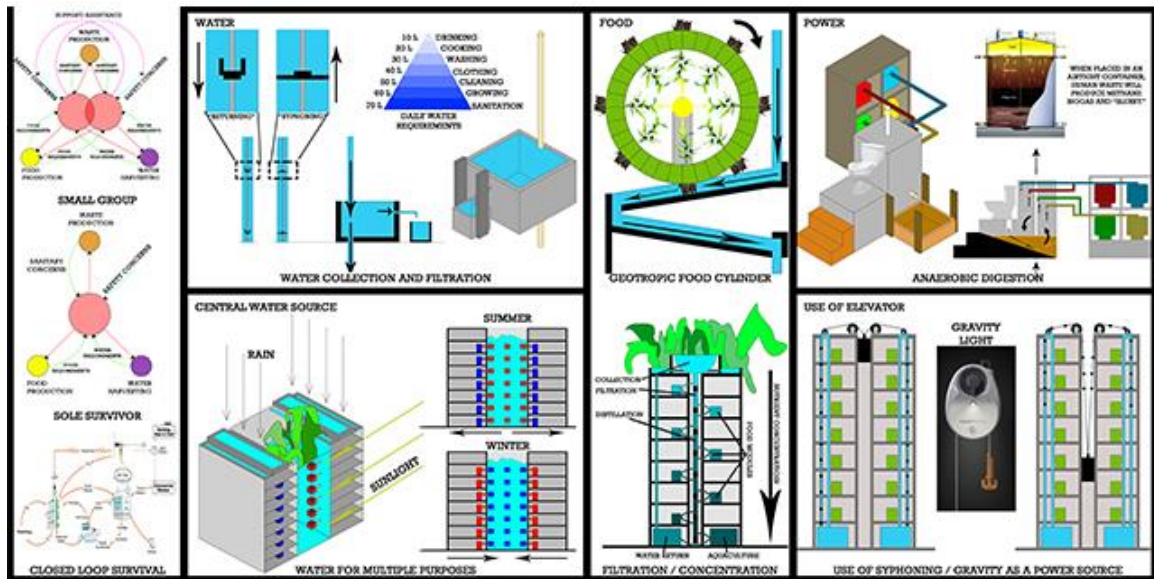


Figure 48. Presentation Boards (Fifth and Sixth)

BIBLIOGRAPHY

- Army, U.S. *US Army Survival Manual*. Print.
- Bird, Carol. *Shelter (Humanity Abides)*. Print.
- Brooks, Max. *World War Z*. Print.
- Brooks, Max. *Zombie Survival Guide*. Print.
- Burrows, Edwin. *Gotham : A History of New York City to 1898*. Print.
- Coldner, Michael. *New York State Public Health Legal Manual*. Print.
- "Designing For the Apocalypse : Why Many Architects Love a Crisis." *Architecture & Morality*.N.p..Web.
- DiTomasso, Lorenzo. *Architecture of Apocalypticism*. : , . Print.
- Dodson, Eric. "Post-apocalyptic film and the post-modern apocalypse." *WestGA.edu*. WestGA.edu.Web. 14 Oct 2013.
- Doxiadēs, Kōnstantinos Apostolou. *Between dystopia and utopia*,. Hartford: Trinity College Press, 1966. Print.
- Gantt, Paul, and Ron Gantt. "Disaster Psychology : Dispelling the Myths of Panic." *Emergency Planning*. 2012.
- Gibbs, Margaret, and Kim Montagnino. "Disasters, a Psychological Perspective."
- "How It Works." *Vertical Garden Design*.N.p..Web.
- Hyde, Natalie. *Population Patterns*. Print.
- Kaplan, Stephan. *Humanscapes*. Print.
- Kaplan, Stephan. *With People in Mind*. Print.
- Kivirist, Lisa. "Victory Gardens : A Salute to Self - Sufficiency." *Hobby Farms* n.pag. *Hobby Farms*.Web.
- Knight, Sara. "Apocalypse Psychology : Deeper Reasons Why Some Expect Doomsday." *Common Health*. 20 Dec 2012: n. page. Print.
- "Late Summer Garden Layout." *Sustainably Modern*.N.p..Web.
- "Living off The Land to Shiny Happy High Rises." *Lonely Planet*.n. page. Print.
- Lundin, Cody. *When All Hell Breaks Loose*. Print.
- McMorrough, John. "Design for the Apocalypse." *C - Lab*. n.d. n. page. Print.
- Moe, Kiel. "Observations on the Concepts of Place in Post-Risk Societies." *Places*. n. page. \Print.
- Nearing, Helen. *The Good Life*. Print

"New York City." *History.com*. n. page. Print.

Pappas, Stephanie. "The Draw Of Doomsday : Why People Look Forward To The End." *Live Science*. n. page. Web. 14 Oct. 2013.

Peltz, Jennifer. "NYC Population Highest Ever; More People Moving Into City Than Out For First Time Since 1950s." *Huffington Post* 03 14 2013, n. pag. Print.

Schneider, Erin. *Apocalyptic Architecture*. Print.

Seymour, John. *The Self - Sufficient Life and How to Live It*. 1976. Print.

"Survivalist Architecture." *Coffee With An Architect*. N.p..Web.

Sullivan, C.C., ed. "The Zombie Dividend : Has Apocalypse Helped Architecture?." . N.p..Web.

United States. Rapid Transit Commission. *Beginnings and Growth of New York City*. Print.

Quirk, Vanessa. "Architecture for the Apocalypse." *Arch Daily*. 21 Dec 2012: Print.

Weisman, Alan. *The World Without Us*. Print.

Yuhas, Daisy. "Psychology Reveals The Comfort Of The Apocalypse." *Scientific American*. 18 Dec 2012: n. page. Print.